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# The World Health Organization and Global Nutrition[1]

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ON JULY 22, 1946, representatives of sixty-one nations signed the constitution of a new World Health Organization. It was a historic event in the history of public health. The signers, men and women of prominence in the field of public health, came from every continent and included representatives of every race.

The document they signed was the product of some years of thought. Health workers had felt that the coming of peace should see not only a new world organization in general but one for health in particular. Accordingly, representatives of Brazil brought to the United Nations Conference in San Francisco proposals that introduced "health" into Sections IX and X of the Charter of the United Nations. Brazil and China proposed the establishment of an international health organization and obtained the approval of the Conference.

To carry this forward, the Economic and Social Council of the United Nations adopted a resolution on February 15, 1946, calling for a Technical Preparatory Committee of public health leaders to meet in Paris to draft a constitution and an International Health Conference to convene in New York in June to consider it.

Fifteen of the experts named by the Council brought to the Paris meeting suggested drafts from four countries, and they drew up a proposed constitution for a World Health Organization, in the words of Doctor Thomas Parran, Surgeon General of the U. S. Public Health Service, "of broad scope and high purpose." They recommended, too, that nations not members of the UN be invited to attend the International Health Conference as observers.

The Conference met in New York City from June 19 to July 22, 1946. Delegations from all of the fifty-one United Nations took part. Representatives of thirteen nations then non-members, three allied control authorities, and ten international organizations attended as observers. The deliberations were of a high order, and the whole work of the Conference was efficiently and democratically conducted and reflected widespread interest.

The constitution of WHO which emerged is an excellent one. The objective of WHO, says Article I, "shall be the attainment by all peoples of the highest possible level of health." The preamble declares "that the following principles are basic to the happiness, harmonious relations, and security of all peoples." The principles that follow are facets of public health thought that are worth our reflection, and the preamble goes on to say:

> Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.
>
> The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic, or social condition.
>
> The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest cooperation of individuals and States.
>
> The achievement of any State in the promotion and protection of health is of value to all.
>
> Unequal development in different countries in the promotion of health and control of disease, especially communicable disease, is a common danger.
>
> Healthy development of the child is of basic importance; the ability to live harmoniously in a changing total environment is essential to such development.
>
> The extension to all peoples of the benefits of medical, psychological, and related knowledge is essential to the fullest attainment of health.
>
> Informed opinion and active cooperation on the part of the public are of the utmost importance in the improvement of the health of the people.
>
> Governments have a responsibility for the health of their peoples which can be fulfilled only by the provision of adequate health and social measures.

These principles give us a general background. To put them into effect, the Organization is stated

[1] Presented at the 29th Annual Meeting of the American Dietetic Association, October 15, 1946, in Cincinnati. Published with the permission of the Surgeon General, U. S. Public Health Service.

to have the following functions, among others:
(1) To act as the directing and coordinating authority on international health work;
(2) To collaborate with other agencies;
(3) To help governments, on request, to strengthen health services, or to meet emergencies;
(4) To maintain epidemiological and statistical services;
(5) To promote, in cooperation with other agencies, the improvement of nutrition, housing, sanitation, etc.;
(6) To propose conventions, agreements, and regulations;
(7) To promote maternal and child health and mental health;
(8) To promote and conduct research in the field of health;
(9) To provide information, counsel, and help;
(10) To revise international nomenclatures;
(11) To standardize diagnostic procedures;
(12) To standardize food, vaccines, and drugs as necessary.

Membership will be open to all states. The Constitution comes into force when ratified by at least twenty-six members of the UN. Non-members which were represented at the New York meeting as observers may become members of WHO if they accept the constitution before the Assembly first meets. After that any nation can apply for membership and be admitted by majority vote. Territories or groups of territories which are not responsible for the conduct of their international relations may be admitted as associate members. The first meeting of the Health Assembly must be called within a period of six months from the date on which the constitution enters into force.

To carry out its functions, WHO is organized into an Assembly, an Executive Board, and a Secretariat. To the World Health Assembly each member nation may send not more than three delegates, one of them the chief of the delegation. Meetings will be held at least once a year. The Assembly will determine policies, pass on the budget, review and approve reports and activities, establish committees, and serve as a link with UN.

For the Executive Board, eighteen member nations will be selected by the Assembly. Terms are three years, so that six countries will be chosen each year with regard to geographical distribution. Each country so selected will appoint to the Board a person technically qualified in the field of health. The Executive Board will be what its name implies and will meet at least twice each year.

The Secretariat will be made up of the Director-General and his technical and administrative staff. The Director-General will be appointed by the Assembly on the nomination of the Board, and in turn will appoint the staff, under regulations set up by the Assembly. The efficiency, integrity, and internationally representative character of the staff are to be the primary considerations in appointment. The conditions of staff service will be much like those of other UN organizations.

There will be a general headquarters the location of which is not yet determined, but much of the field work will be carried on through the regional organizations. The Assembly, when it meets, will decide on how many regions there will be. Various numbers, up to ten, have been mentioned. It would seem reasonable to expect at least three at the start—one for the Americas, one for Europe and Africa, and a third for Asia and the Southwest Pacific. Doubtless others will be set up as needs become apparent.

Each regional organization is to be made up of a Regional Committee and a Regional Office. The Committee will be composed of representatives of the member states and associate members in the particular region. Here associate members might play their largest part. The regional committee will meet as often as necessary, formulate policies for matters entirely regional, and supervise the activities of the regional office, within the framework of WHO. The regional office will have a regional director and a staff. In addition to the sums received from the central budget, the regional organization may recommend further appropriations from the countries of the region for special work. It may thus advance the health work of the region just as rapidly as its members wish, following, of course, the general policies of the WHO. The Pan-American and other regional organizations now existing are to be integrated in due course into the WHO.

Of the sixty-one nations which signed the constitution on July 22, only two, China and the United Kingdom, did so finally without reservations or need for further ratification. Since then Canada has also ratified. The question will come before our Congress in 1947. There is every reason to expect favorable action.

To fill the gap and permit work to begin while the nations are accepting the constitution, an Interim Commission was set up, with representatives from eighteen selected countries. The Commission met in New York in July and elected Dr. G. B. Chisholm of Canada as executive secretary. It met in November in Europe to take over the epidemiological information service from various organizations and to make plans for starting work in other fields.

Such is the framework of WHO. Let us enumerate the functions in the field of nutrition in which we are particularly interested. In Chapter II the organization is authorized to "promote, in cooperation with other specialized agencies where necessary, the improvement of nutrition," and to "develop, establish, and promote international standards with respect to food." From Chapter V the Assembly

may "promote and conduct research in the field of health by the personnel of the Organization, by the establishment of its own institutions, or by cooperation with official or nonofficial institutions of any Member with the consent of its government." In Chapter VIII the Executive Board is authorized to "provide for the creation of or the participation by the Organization in joint or mixed committees with other organizations and for the representation of the Organization in committees established by such other organizations." One function of the Interim Commission is to "establish effective relations and enter into negotiations with a view to concluding agreement with other intergovernmental organizations." WHO thus has ample warrant to act effectively in the field of nutrition.

The question then is: what should WHO do in global nutrition?

The needs are many, large, and varied. Only a short time ago there were battles and sieges and cutting of food supply lines by land, sea, and air. People starved, sometimes because conquerors drained the country of food, as in Greece and Holland; sometimes because invaders ravaged the fields, as in central China; sometimes because liberators could not bring food in fast enough, as in Hanoi in northern Indo-China. Other people, who did not starve and die quickly, developed nutritional disturbances and died more slowly. In Singapore in the first six weeks after liberation, beriberi was the cause of 16.2 per cent of all the deaths (1). In Manila in ten months after liberation 1211 deaths were reported due to starvation, 2684 to beriberi, and 178 to other avitaminoses—a total of almost one fourth of all the deaths in that time. Saigon was distressed with beriberi in the political disburbances late in 1945. But military Civil Affairs and UNRRA made plans and shipped in food, and the acute postwar situation has gradually eased.

Today the world patient is over his first acute attack, but he is suffering from a chronic condition that is more serious than we realize. We hear of overflowing harvests in North America and Australia, a surplus in the Ukraine, the coming of the rice harvest in Burma, Siam, and Indo-China; but all these are more than offset by crop failures in India, where a fifth of the world's people live, by crop failures and civil war in China, by lack of transportation in many places, and by absence of any reserve supply. We think largely of the newspaper stories of huge crops too big for the elevators, with wheat piled on the ground. Competent authorities (2) tell us, however, that it will be three or four years before world food supplies catch up with the barest of world needs. For at least that time the world will need special skill to plan to meet special conditions, to shift any small surplus from one place to meet a need in another, to avert disaster.

When that is passed we shall still have a residual problem in every country. Some people will starve and more will be malnourished, and many will not have that "state of complete physical, mental, and social well-being" of which the preamble of the WHO constitution speaks. Because of poverty, scarcity, ignorance, or social custom they will not eat enough of the right foods, properly prepared. Even in the wealthy United States that problem exists right now, and dietitians are wrestling with it. An unpublished report states that in school groups recently surveyed by the U. S. Public Health Service, anemia in the colored children under thirteen years of age ranged from 60 to 70 per cent, and in the white children of the same age group from 20 to 37 per cent. The same problem in a greater or lesser degree is found in every other country. FAO, the Food and Agriculture Organization of the UN, said in July of this year (3):

> It is evident from this survey that about half of the world's population was subsisting before the war at a level of food consumption which was not high enough to maintain normal health, allow for normal growth of children, or furnish enough energy for normal work. Poor nutrition is associated with high death rates and a low expectation of life, high mortality in infancy and early childhood and among women during the child-bearing period, increased susceptibility to many diseases such as tuberculosis, and impaired working capacity.

and again (4):

> . . . even before the war disrupted and depleted food supplies, about half the world's population was seriously undernourished, about one sixth was eating at a marginal level, and somewhat less than a third was enjoying high calorie diets.

As Doctor Parran stated, in summing up the Conference in New York, "Hunger and malnutrition stunt the bodies and warp the minds of a large part of the world's population."

What will WHO do about this?

It will not be the first organization to grapple with the problem of world nutrition. Others have appreciated its importance and have been at work.

The Health Section of the League of Nations began with a single nutritionist on its staff from 1930 to 1935. It set up a Mixed Committee on Nutrition which between 1935 and 1936 reviewed the effect of improved nutrition upon health and the relation to nutrition of agricultural and economic problems. About the same time the International Labor Organization, knowing a relation exists between how a man eats and how he works, joined with the Pan-American Sanitary Bureau in a number of studies of nutrition questions. The first Labour Conference of American States of the International Labor Organization, held at Santiago, Chile, in 1936, urged the office to devote attention not only to the best methods of studying nutrition questions,

but also to the framing of a common policy on nutrition for adoption by the different states. The Pan-American Sanitary Bureau itself sponsored a study of nutrition in Mexico, with detailed food analyses, and recently aided the Central American states in establishing a promising nutritional project.

Within the last year FAO, a development of the Hot Springs Conference, made a notable start in its work. It is significant that FAO appointed as its head Sir John Boyd Orr, a distinguished visitor at a recent meeting of the American Public Health Association. As director, he promptly set up a Division of Nutrition and secured as its chief Dr. W. R. Aykroyd of the Coonoor Nutrition Research Laboratories, India, one of the leading medical nutritionists of the world. Some sentences from one of their recent publications are striking (5): "There has never been enough food in the world. . . . Food consumption is directly correlated with health. . . . The remarkable improvement in health and physical well-being following an improvement in diet shows that inadequate food is one of the main causes of the preventable diseases, misery, and premature death which afflict the majority of the human race."

A more recent group, UNESCO (United Nations Educational, Social, and Cultural Organization) is showing a natural interest in nutrition, from an educational viewpoint.

Since WHO has not yet done any concrete planning, an account of its work in global nutrition must be largely supposition, or what it might be expected to do. Its work in nutrition will probably have two phases. One will be close and early cooperation with these other international organizations already interested in this field, ILO, UNESCO, and particularly FAO. Joint committees should be set up, and the directions determined from which each organization will attack the common problem. Where the special concern is largely a matter of health, it will be a WHO committee, with advice from the other groups, and vice versa. Secondly, within itself WHO may develop its own research institute in nutrition, but that will probably come later. At first WHO is more likely to work largely through and with its own regional offices, advising and stimulating. The nations of each region would be particularly interested in a common approach to a general problem, in exchanging experiences and comparing methods. Regional activity will stir the different countries in the region. In turn, the methods and findings of one region will be of interest and value to the others, and all will consequently move ahead more quickly.

The author believes that the investigations of WHO in the near future in the field of nutrition might well have four aspects. One would be a study of food consumption. What does the average person in a given country or group actually eat today—what foodstuffs, at what price, together with weight and chemical composition information, including vitamins and calories? What, in short, does he eat? Such studies have been made in many countries and are valuable. They need to be extended to all countries and many sections of each country. Perhaps some of the older studies should be re-examined in the light of our latest knowledge.

A second line of attack would be to study foodstuffs available for a country or a group, their chemical composition and nutritional values. Such a study sometimes shows that a local fruit or vegetable is rich in desirable nutrients. If that article is in short supply, FAO would have work to do. Some foods will need protection in processing so that valuable properties may not be lost.

A third approach would be a worldwide study of nutritional disease itself, from all angles—clinical, chemical, and epidemiological. What shortages in diet cause what, and how can the condition be diagnosed and treated? How can analytical methods be improved? We have learned much in the last decade or two, but many questions are still unanswered. For instance, vesical calculus, or stone in the urinary bladder, is very common and very painful in such regions as northern Siam, southern China, and Syria. McGarrison in India showed years ago that this condition could be produced in rats by feeding diets low in vitamin A. Japanese workers confirmed this, but the laboratory work has not yet been linked up with human suffering. Chemical and epidemiological study of the diets of groups of such patients might indicate lines for prevention or treatment. To give a second illustration nearer home, what is the real relation of diet to dental caries?

A fourth study would concern the application of all our knowledge. Suppose we find out what a person actually eats, and what he is able to eat living in a given place with given earnings. Even when we know what he should eat to live in a state of greatest health, the question remains: how are we going to get him to eat it? That calls for health education. We may have to reach the wage earner through the housewife, or both through the child in school. Here is a place for working with UNESCO.

The nutrition project which the Pan American Sanitary Bureau stimulated in Central America is well worth describing. Last February the five countries of Central America, with Panama, signed an agreement to engage in a four-year study, with the help of the Bureau and of one of the foundations. A physician, a biochemist, an agronomist, and a health educator from each country will receive a year of special training in the United States, then will work on this program for at least three years more. A nutrition laboratory will be set up in Guatemala City. In each country food consumption will be

studied, and food supplies sent to the central laboratory for analysis. Production of the proper food will be stimulated. The physician will investigate nutritional diseases, and the educator will try to train her public in the ways of health. A medical nutritionist will direct the entire program. That is an admirable local plan, and one that may well be copied in other parts of the world.

Structurally the group proposed for each country is not unlike the nutrition team which the Dutch sent to Java in December, 1945, or the Nutrition Working Party consisting of a medical officer, an agronomist, a food technologist, and a nutritionist proposed for the British West Indies. Our own U. S. Public Health Service demonstration units are staffed by a medical officer, a nutritionist, a chemist, a public health nurse, a laboratory technician, and a clerk—a little more elaborate, but much the same. The Central American plan, however, is a joint effort of six countries, stimulated by an international organization, and as such has a special contribution to global strategy.

WHO will begin to operate shortly. Its first actions in nutrition will probably be the appointment of a director of nutrition, and the authorization of an advisory committee on nutrition. We shall see close cooperation with FAO, whose standing advisory committee has already indicated points in which the two groups are both concerned. Then the real work will start. Today the stage is set for WHO. The energy with which it proceeds to join hands with others and to develop its program will decide how rapidly we shall see malnutrition disappear.

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## *Increases in the Useful Life Span*

Much might be learned from studies of a combined clinical and statistical type in which an interesting beginning had been made by Langstroth seventeen years ago. From a study of 501 dietary histories of his patients, he found a distinct inverse relationship "between the percentage of protective food in the previous diet and the percentage incidence of chronic circulatory disease, chronic arthritis, chronic gastrointestinal disease, migraine, and diabetes in persons over thirty."

Although this paper was read at the Eightieth Annual Session of the American Medical Association and published as the leading article in the November 23, 1929 issue of its *Journal*, there has been surprisingly little publication of professional comment upon it. The abstract of discussion printed with the paper and conversations with some physicians leave the impression of doubt as to how far Langstroth's patients were actually diseased in the usual sense and how far they were cases of premature aging. In fact, Langstroth himself used the phrase "degenerative or senile process." If thus interpreted, Langstroth's findings become all the more directly applicable to the question of whether the useful life span can be increased through a more nutritionally guided use of food at all ages. We may leave out all disease names and say: the higher the proportion of protective food, the lower the percentage of failure in the preservation of the characteristics of youth.

We have learned in recent years that nutritionally guided adjustments of the kinds and relative proportions of food consumed cannot only guard against malnutrition but also can constructively improve the body's internal environment which directly governs and conditions our life processes.

Clearly included among the human implications of what has already been established in the laboratory are: a more advantageous start in life, higher health and lower death rates at all ages, an increase in the adult life expectation with a larger ratio of increase in the period of the prime of life (full adult capacity), and a smaller percentage of years of dependency.

By further research, we may now reasonably expect to find a larger number of dietary paths to this plateau of more nearly optimal nutrition, and also a further extension of this plateau of the prime of life.—*From a paper by Dr. Henry C. Sherman, Department of Chemistry, Columbia University, presented at the Symposium of the Nutrition Foundation, Inc., in New York City, November 13, 1946.*

# Principles of Nutritional Rehabilitation[1]

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WARTIME experience in Britain and elsewhere in nutritional planning is of some interest in coping with the problems of European rehabilitation since it exemplified the truth which is sometimes forgotten, namely that nutrition is a biological science and can only be applied effectively to man in his biological environment if wider considerations than those of biochemistry alone are remembered. Nutritional principles can only be applied with full effect if the general behavior of the people concerned, including their food habits and preferences, are considered.

A fundamental problem in Europe today, as it was in the United Kingdom during the war, is the provision of an adequate supply of calories. Since in Britain cultivation of crops could produce a far greater yield of food per acre than the raising of livestock, large areas of pasture were ploughed up. As an extension of this policy, in 1940 the government introduced a wheaten flour of 85 per cent extraction, and its use became general in 1941. When, at the height of the world food shortage in July, 1946, bread rationing was introduced, a flour of 90 per cent extraction was in use. The composition of flours of increasing extraction are shown in Table 1. Quite apart from the contribution to the B-vitamin intake made by the increase in extraction rate, it can be seen that the number of calories provided by 100 gm. of wheat increased from 249 derived from 73 per cent extraction flour up to 307 from 90 per cent extraction flour. The table also shows the effect of the development in milling technique on the types of wheat available in successive years.

The production of the maximum acreage of wheat and other arable crops and the increase in milling extraction exemplify the first fundamental for nutritional rehabilitation: *provide the maximum supply of calories.*

There are three difficulties in using bread made from high extraction flour. First, it is unpopular in certain countries. This objection, while not insurmountable, may on occasion be important. The second objection is the reduction in digestibility. Whereas the energy-digestibility of 75 per cent extraction flour is 97 per cent, that of 90 per cent extraction flour is 91.5 per cent. It has, however, been the experience in Britain that this reduced digestibility is of no medical significance. These two drawbacks are accentuated when it is attempted to use 100 per cent wholemeal and to obtain thereby the remaining calories in the grain. Third, the incorporation of the outer parts of the wheat grain into flour raises the amount of phytic acid in the diet and may thus affect the absorption of calcium and perhaps of iron. This is of particular significance when, as must almost inevitably be the case, an increased extraction, which involves a reduced supply of animal feedingstuffs, causes a reduction in the milk supply. To counterbalance this effect, and at the same time to make good an overall prewar deficiency of calcium in the national diet, 7 oz. of calcium carbonate were added to each 280 lb. of flour when the extraction rate was 85 per cent and double this amount was added to 90 per cent extraction flour.

As with calories, so with other aspects of nutrition, the maximum food value must be obtained from each ton of food supply, and crops must be considered to a large extent on their nutritional merits. The farm animals can be assessed in order of their efficiency as converters of fodder into animal protein, and vegetables can be ranged in proportion to their yield of vitamin A-activity or ascorbic acid per acre. The relative values of a number of vegetables grown under British conditions are shown in Table 2.

The second fundamental for nutritional rehabilitation after a maximum supply of calories has been assured, therefore, is: *so to design the food supply that its nutritional value approximates as closely as possible the total requirements of the population to be fed.*

This process is essential to a rational consideration of nutritional rehabilitation, but there appears in practice to be a limit to which it can be pushed.

[1] Presented at the 29th Annual Meeting of the American Dietetic Association, October 15, 1946, in Cincinnati.

TABLE 1

*Composition of flour of varying extraction**

| PERIOD | EXTRACTION | CALORIES | PROTEIN | FAT | IRON | CALCIUM | THIAMINE | NIACIN | RIBOFLAVIN | FIBER |
|---|---|---|---|---|---|---|---|---|---|---|
| | % | | *gm.* | *gm.* | *mg.* | *mg.* | *mg.* | *mg.* | *mg.* | *gm.* |
| 1940–March, 1941 | 73 | 342 | 12.3 | 1.8 | 1.4 | 14 | 0.09 | 0.9 | 0.05 | 0.10 |
| March, 1941–April, 1942 | 75 | 342 | 11.8<br>12.5 | 1.3 | 1.4 | 15 | 0.12 | 0.9 | 0.06 | 0.15 |
| April–September, 1942 | 85 | 340 | 12.3 | 2.2 | 2.4 | 21 | 0.33 | 1.9 | 0.17 | 0.70 |
| October, 1942–December, 1943 | 85** | 340 | 11.4 | 1.6 | 2.4 | 81 | 0.30 | 1.7 | 0.15 | 0.55 |
| January–September, 1944 | 85** | 340 | 10.7 | 1.6 | 2.1 | 76 | 0.29 | 1.7 | 0.13 | 0.50 |
| October–December, 1944 | 82½** | 340 | 12.6 | 1.6 | 1.9 | 79 | 0.26 | 1.8 | 0.10 | 0.31 |
| January, 1945–February, 1946 | 80** | 340 | 12.0 | 1.4 | 1.6 | 73 | 0.24 | 1.6 | 0.08 | 0.21 |
| March 1–15, 1946 | 82½** | 340 | 11.6 | 1.5 | 1.9 | 79 | 0.26 | 1.8 | 0.10 | 0.31 |
| March–May, 1946 | 85** | 340 | 10.7 | 1.6 | 2.1 | 76 | 0.29 | 1.7 | 0.13 | 0.50 |
| May–August, 1946 | 90** | 330 | 13.0 | 1.9 | 2.8 | 86 | 0.33 | 3.6 | 0.14 | 0.90 |
| After August 11, 1946 | 90† | 330 | 13.0 | 1.9 | 2.8 | 148 | 0.33 | 3.6 | 0.14 | 0.90 |

* Expressed per 100 gm. of flour.
** $CaCO_3$ added.
† Increased $CaCO_3$.

During the war the acreage of carrots in Great Britain was greatly increased in order to raise the amount of vitamin A available in the national diet to a figure equal to the nutritional requirement, and simultaneously a vigorous publicity campaign was launched to persuade people to eat the carrots they needed. Although this campaign achieved a substantial measure of success, the British public eventually came to look with disfavor on carrots regardless of their vitamin A content. On the other hand, in allocating land for vegetable production, the area originally given to onions was small in view of their negligible contribution of ascorbic acid and vitamin A. It was found, however, that no matter how effectively the nutritional negligibility of onions was pointed out to the British public, they insisted on standing in queues for long periods to obtain the limited amounts available. Similarly, just as the ration of wine is important to the well-being of the French, so also is a reasonable supply of beer of significance in the British diet even though it is clear that there is a caloric loss during the process of fermentation. It has thus repeatedly been found that dietary habits may exert a seemingly disproportionate influence on nutrition.

The third fundamental of nutritional rehabilitation is: *the planning of distribution within the population to meet the nutritional needs of different physiological groups.* "Vulnerable" groups will include children, mothers, or adolescents. It is obviously of cardinal importance to insure that milk, when the supply is limited, be distributed first to infants, young children, and nursing mothers, and that only after these commitments have been met that the remainder be divided among the adult population. Occasionally, however, as in the case of German miners in the Ruhr, a group receiving priority food may comprise adults of exceptional economic importance to the community. In Britain, under the stress of war, it was clearly essential to strive to maintain industrial workers at the highest possible level of efficiency. The method adopted was the provision of coupon-free meals "on the job."

In designing the ration allowances shown in Table 3, it was planned that the amounts of food provided should be sufficient to form the basis of a meal capable of providing approximately one third of the day's calories to the class of people eating it. In Britain during the war years equal rations and allowances of meat, fats, sugar, cheese, preserves, and milk were issued to all adults while bread, flour, potatoes, and vegetables were plentiful and unrationed. The increasing amounts of meat made available for canteens serving workers were given not to supply protein for which the workers[1] needs are no greater than those of other adults, but to enable a larger meal of reasonable palatability to be prepared for the more active people. Only for school children was the larger allocation of meat given as a source of animal protein. Again, the provision of fat for canteen meals was designed to enable calories to be provided for the workers in a reasonably palatable form. The larger issue of fat in the form of suet was provided for school children to enable increased calories to be given without too great bulk.

In considering problems of European rehabilitation, it is of some interest briefly to discuss a few of the points emerging from this British experience in providing meals in industrial canteens.

The dietary habits of British industrial workers are varied. Although this diversity of behavior was well known, there was little precise documentary information available on the dietary mannerisms in different industries and in different parts of the country. When the provision of meals "on the

TABLE 2

*Approximate value of vegetables as sources of vitamin A and ascorbic acid*

| | POTENCY PER 100 GM. AS PURCHASED | AVERAGE YIELD PER ACRE | POTENCY PER ACRE |
|---|---|---|---|
| Vitamin A (as carotene) | | | |
| | *I.U.* | *tons* | *million I.U.* |
| Carrots | | | |
| Old | 16,000 | 11.1 | 1804 |
| New | 9,500 | 11.1 | 1071 |
| Lettuce | 3,200 | 5.97 | 194 |
| Tomatoes | | | |
| Under glass | 2,550 | 31.6 | 819 |
| In the open | 2,550 | 7.73 | 200 |
| Cabbage | 630 | 9.09 | 58 |
| Green onion | 560 | 7.64 | 43 |
| Runner beans | 450 | 3.91 | 18 |
| Leeks | 350 | 7.88 | 28 |
| Brussels sprouts | 300 | 3.44 | 10 |
| Green peas | 200 | 2.27 | 5 |
| Asparagus | 140 | 1.23 | 2 |
| Parsnips | 130 | 9.6 | 13 |
| Ascorbic acid | | | |
| | *mg.* | | *kg.* |
| Brussels sprouts | 75 | 3.44 | 2.6 |
| Cabbage | 49 | 9.09 | 4.5 |
| Cauliflower | 49 | 6.38 | 3.2 |
| Swedes | 26 | 10.1 | 2.7 |
| Tomatoes | | | |
| Under glass | 21 | 31.6 | 6.7 |
| In the open | 21 | 7.73 | 1.6 |
| Turnips | 16 | 10.1 | 1.6 |
| Green onions | 16 | 7.64 | 1.2 |
| Potatoes (average) | 15 | 7.1 | 1.1 |
| Runner beans | 15 | 3.91 | 0.6 |
| Green peas | 12 | 2.27 | 0.3 |
| Lettuce | 12 | 5.97 | 0.7 |
| Asparagus | 12 | 1.23 | 0.1 |
| Leeks | 10 | 7.88 | 0.8 |
| Bulk onions | 10 | 6.56 | 0.7 |
| Broad beans | 8 | 2.90 | 0.2 |
| Beetroot | 7 | 10.2 | 0.7 |
| Parsnips | 7 | 9.6 | 0.7 |

job" became a part of a planned system of food distribution, the investigation of food habits and their influence on the nutrition of the different types of workers was of direct practical importance quite apart from its scientific interest.

The survey method used in the studies reported here was that employed by Wiehl (1) and depends on the interrogation of the people being investigated regarding everything they have eaten or drunk in the previous 24 hr. In the present studies duplicate amounts of the actual foods eaten were weighed in order to estimate the quantities consumed. The nutritional value of the total daily food consumption found for a number of types of industrial workers is shown in Table 4.

There are a number of weaknesses to be seen in these diets, the most obvious of which is a shortage of riboflavin and of vitamin A to which reference has already been made. The consumption of ascorbic acid, although substantially less than the level recommended by the National Research Council, was probably sufficient to prevent ill health. An interesting feature of these diets, however, was the number of meals of which they were composed. Whereas it had originally been assumed that people ate three meals a day, it was soon found that coal miners on certain shifts and in certain districts ate four meals a day as did some industrial workers. On the other hand, the miners in a second district, workers in a railway freight yard, and shipbuilders ate five meals a day; and steel roller men and cotton spinners ate six meals. If the provision of communal meals is a part of national nutrition or rehabilitation, it is important, therefore, that something of the dietary habits of the people for whom the meals are intended be known. One third of the day's requirement cannot appropriately be given in a single meal to an individual who eats six meals a day.

Table 5 shows the dietary pattern of the men working on the morning shift at a steel rolling mill. In this case the communal feeding took the form of the two snacks served during working hours which together provided some 1300 calories.

The number of meals eaten by workers in different industries, the variation in the nutritional needs of different classes of workers in the same industry, and the effect of shift times on the dietary pattern of workers are all detailed considerations which must be considered in planning nutritional measures through the medium of communal meals. These have been discussed elsewhere (2).

The profound influence which dietary habits exert on nutritional intake when they remain uninfluenced by education is perhaps worth re-emphasizing. Although no convincing scientific evidence is available to show that muscular work raises the requirements for animal protein, there is a strong prejudice on the part of the workers themselves in favor of large amounts of meat. In 1925 Cathcart (3) collected the evidence in favor of the provision of protein for muscular workers. Some further evidence in favor of meat, at least as a source of niacin, may be said to have been provided by Frankau (4). Be that as it may, the provision was made in Britain that coal miners to whom canteen meals were unavailable should receive a substantial additional ration of cheese, and efforts were made to explain to the men that cheese could in many respects be substituted for meat. Nevertheless, large and consistent variations existed between the cheese consumption in different coal fields, although it was difficult to demonstrate any real difference in the physiological conditions under which men worked.

The fourth fundamental for a logically planned scheme for rehabilitation is: *a knowledge of actual conditions within each country.*

These four principles on which the application of nutrition to food administration should be based are now well known. It may, however, be useful to compare the development of affairs in Great Britain with the experience already available on conditions in Europe.

When the Allied Administration was first established in Vienna in September, 1945, the rations available to normal consumers were completely inadequate, and indeed, provided little more than 900 calories daily, 33 gm. of protein, no vitamin A, and no ascorbic acid. The first task, therefore, of the Allied Administration was to draw up a series of ration scales to provide as much of the nutritional requirements of the different classes of the population as the food supply would allow. The comparison between the composition of the diet actually available to normal consumers in Vienna, the compo-

TABLE 3

*Amounts of rationed foods provided for communal meals of different types in 1943*

| RATIONS | AMOUNT* OF RATIONS PROVIDED FOR | | | |
|---|---|---|---|---|
| | Normal caterers | Workers in light industry | Workers in heavy industry | School children |
| Bacon | 0.14 | 0.14 | 0.14 | 0.14 |
| Fats | 0.30 | 0.50 | 0.50 | 0.50 |
| Sugar | 0.12 | 0.12 | 0.20 | 0.40 |
| Meat | 1.00 | 1.50 | 2.00 | 2.00 |
| Fish | 0.32 | 0.32 | 0.32 | 0.32 |
| Cheese | 0.21 | 0.21 | 0.21 | 0.21 |
| Preserves | 0.14 | 0.14 | 0.14 | 0.20 |
| Dried egg | 0.16 | 0.16 | 0.16 | 0.16 |
| Liquid milk (pt.) | | | | (0.09) |
| Dried skim milk | 0.12 | 0.12 | 0.12 | 1.00 |
| "Points" (i.e., sausage meat) | 0.67 | 0.67 | 0.67 | 1.87 |
| Suet | — | 0.08 | 0.08 | 0.16 |

* Oz. per main meal

TABLE 4

*Nutritional value of the daily wartime diet of certain groups of British industrial workers*

| OCCUPATION | CALORIES | PROTEIN | FAT | CALCIUM | IRON | VITAMIN A | THIAMINE | RIBOFLAVIN | NIACIN | ASCORBIC ACID |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *gm.* | *gm.* | *gm.* | *mg.* | *I.U.* | *mg.* | *mg.* | *mg.* | *mg.* |
| Men | | | | | | | | | | |
| Sawmill operatives | 4700 | 140 | 180 | 1.6 | 22 | 3000 | 2.4 | 3.3 | 37 | 41 |
| Loggers | 4650 | 130 | 190 | 1.2 | 22 | 2500 | 2.5 | 2.9 | 33 | 31 |
| Cotton spinners* | 4050 | 90 | 150 | 1.2 | 16 | 2400 | 1.8 | 1.9 | 17 | 31 |
| Steel rolling mill workers | 3750 | 130 | 110 | 1.6 | 22 | 2800 | 2.4 | 2.1 | 18 | 57 |
| Coal miners | | | | | | | | | | |
| Underground workers | 3700 | 110 | 120 | 1.3 | 23 | 2100 | 2.4 | 1.7 | 16 | 30 |
| Mechanics | 3600 | 120 | 110 | 1.3 | 23 | 2100 | 2.4 | 1.9 | 15 | 34 |
| Surface workers | 3450 | 100 | 100 | 1.1 | 21 | 2000 | 2.6 | 1.7 | 15 | 29 |
| Shipyard workers | 3300 | 120 | 110 | 1.4 | 19 | 2500 | 2.1 | 1.8 | 19 | 45 |
| Railway goods handlers | 3300 | 100 | 100 | 1.4 | 19 | 2900 | 2.0 | 2.1 | 17 | 46 |
| Women | | | | | | | | | | |
| Cotton spinners | | | | | | | | | | |
| Girls fourteen to eighteen years old | 3500 | 90 | 140 | 1.1 | 19 | 2500 | 1.6 | 1.6 | 12 | 28 |
| Women | 2700 | 70 | 100 | 1.0 | 13 | 2300 | 1.4 | 1.5 | 11 | 29 |

* Mule spinners whose work demanded constant walking.

TABLE 5

*Calculated nutritive value of the average meals eaten by men working in a steel rolling mill during the 6 a.m.–2 p.m. shift*

| | CALORIES | PROTEIN | FAT | CALCIUM | IRON | VITAMIN A | THIAMINE | RIBOFLAVIN | NIACIN | ASCORBIC ACID |
|---|---|---|---|---|---|---|---|---|---|---|
| | | *m.* | *gm.* | *mg.* | *mg.* | *I.U.* | *mg.* | *mg.* | *mg.* | *mg.* |
| Breakfast, 5:30 a.m. | 410 | 11 | 18 | 160 | 2 | 270 | 0.2 | 0.17 | 1.1 | 0 |
| Snack, 8 a.m. | 880 | 31 | 35 | 410 | 6 | 600 | 0.7 | 0.59 | 3.9 | 0 |
| Snack, 11 a.m. | 410 | 13 | 4 | 170 | 3 | 130 | 0.3 | 0.20 | 0.7 | 0 |
| Dinner, 3 p.m. | 840 | 31 | 25 | 250 | 6 | 350 | 0.8 | 0.51 | 7.5 | 35 |
| Tea, 6 p.m. | 610 | 23 | 21 | 340 | 4 | 1120 | 0.4 | 0.30 | 2.0 | 10 |
| Supper, 10:30 p.m. | 1000 | 22 | 27 | 390 | 2 | 510 | 0.1 | 0.23 | 1.8 | 2 |
| Total daily intake | 4150 | 131 | 130 | 1720 | 23 | 2980 | 2.5 | 2.00 | 17.0 | 47 |

sition of the official ration, and the nutritional requirements is shown in Figure 1. It can be seen that although the food actually available was inadequate, both before and after the Allied ration scale was introduced at the end of September, in the latter case the food actually eaten was less than the official ration, whereas previously more food had been obtained than was officially issued. This matter is a constant source of difficulty in the work of rehabilitation and underlines the essential importance of having available accurate information of the state of existing affairs.

Although the diets shown in the figure are deficient in a number of respects, the primary shortage shown is one of calories. It might have been expected, therefore, that the Austrians would have taken vigorous measures to obtain the maximum from their limited food supplies. It is worth noting, however, that there was strong resistance against the efforts of the Administration to raise the milling extraction rate although the need for this measure was obviously far greater than in Britain.

Rehabilitation, so far as nutrition is concerned, has been stated as being fundamentally a problem of providing people with enough to eat, and the obstacle preventing quick rehabilitation at the present time is the fact that an insufficient supply of food is available. In Austria the people themselves have appreciated the problem of making available sufficient milk for the children, and all the milk available in Vienna is issued to children; none is left for adults.

The provision of communal meals in Vienna has been vigorously undertaken, and meals are provided for school children and the industrial workers. So far as the expectant and nursing mothers are concerned, an interesting contrast in methods of rehabilitation is to be seen. In one section of Vienna pregnant women receive fortnightly four food parcels, each containing tins of milk, meat, vegetables, butter, and other foodstuffs. The women may take these parcels home and dispose of them as they please. In another part of the town the women are required to come to a center where they are given food supplements which they must consume there. Here it would seem we have a problem with a wider application than that of the expectant mothers of Vienna. Is it a more satisfactory method to treat people as experimental animals undergoing nutritional tests, or should we regard them more broadly within their whole environment?

It is a fairly general experience that in most areas the nutritional lessons of the last thirty years have been learned. Dietary deficiency diseases are rare. Nations can make available for themselves a

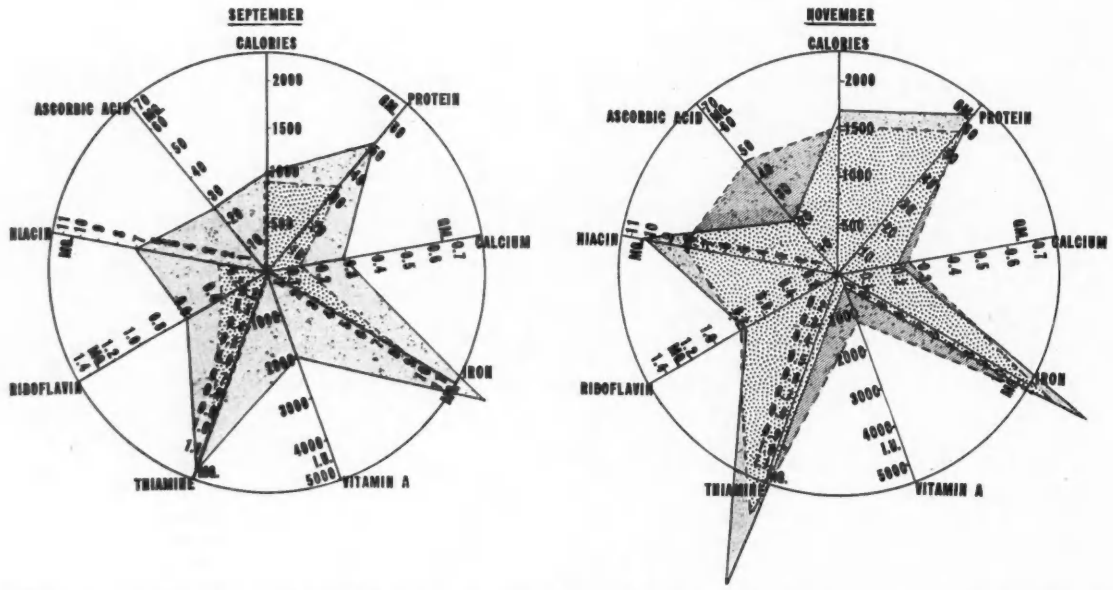


FIG. 1. *A comparison between official rations, actual consumption, and requirement of normal adult consumers in Vienna, 1945.*

LEGEND

Length of each radius is proportional to the full nutritional requirement.
Solid line indicates nutritional value of diet.
Broken line indicates nutritional value of official ration.

minimum sufficiency of green vegetables and perhaps of milk for their children. The shortage of calories leads to the consumption of a substantial proportion if not always a maximum of the cereal grains available and thus prevents the appearance of diseases due to the deficiency of the B-vitamins. However, the provision of food for the future, and more particularly its distribution according to physiological need, will not be without difficulty. Already economic problems are beginning to emerge. In spite of the efforts of such international bodies as FAO, the price of food is once more becoming an important factor in limiting national food supply. It is germaine to remember that the British exchequer pays out approximately £170 million a year to subsidize the price of food and hold down the cost of living so far as food is concerned. Can ruined European countries do this?

A second factor which is of more direct interest to the nutritionist in planning rehabilitation is the realization of our present lack of knowledge of nutritional requirements. Two practical aspects of this are our ignorance of the requirement of animal protein and of fat. Since milk is under normal circumstances the single most important contributor of animal protein to the diet, it becomes important to estimate the respective requirements of animal protein of children of varying ages, of adolescents, of adults, and of expectant and nursing mothers. It may not be sufficient merely to allocate milk to young children without balancing the requirements also of the adults. A singular feature of the clinical picture to be seen in Vienna was the striking incidence of anemia among adults although the total iron content of the diet appeared to be fully adequate. Investigation to see whether the deficiency of animal protein might not have played a part in the incidence of anemia might well have been made.

The requirement for fat also may be of crucial importance in nutritional rehabilitation, although the physiological needs for fat as a nutrient may be negligible and may be restricted merely to the fulfillment of the requirements for unsaturated fatty acids and for fat soluble vitamins. A reasonable supply of fat is of material significance in the design of a diet for the rehabilitation of a nation. An example of the influence of the shortage of fat in the British diet is provided by the manner in which it limits the consumption of fish, which under normal circumstances, is consumed in large quantities fried.

The success of the Combined Food Board in arranging a reasonable distribution of the food resources of the United States and of the British Empire to maintain jointly the maximum health and efficiency for the prosecution of the war was largely due to detailed scientific collaboration which enabled a precise estimate of the nutritional value of the average daily diet in the United States, the United Kingdom, Canada, Australia, and elsewhere to be made. This precision was only reached after innumerable food analyses had been carried out, joint tables of food composition drawn up, and considerable scientific research undertaken. The present problems of European rehabilitation, which are linked with the wider world problems of FAO, open up a new field. The countries where the need for rehabilitation is greatest are often those with the least reliable statistics and where the knowledge of the nutritional value of the available diets is most scanty.

The fundamental problems for rehabilitation would appear to be four-fold:

(a) The provision of calories, i.e., enough to eat;

(b) The design of a food supply to meet the national nutritional requirements;

(c) Distribution according to physiological need;

(d) Knowledge of the true nutritional state.

The history of the past year has demonstrated the danger and confusion arising from insufficient knowledge. On the one hand, statistics often suggest that the average food intake of a country is insufficient for life. Reports of national average intakes of 1000 calories have been received, while simultaneously few signs of ill health or malnutrition exist. Other countries, where accurate statistics are available, may show that the total food supply provides an overall nutritional value adequate for the needs of the population while at the same time it can be shown that a proportion of malnutrition exists.

The experience of wartime nutritional planning can, therefore, be of value in two ways. First, it shows how the broad principles of nutrition can be applied to the design of a nation's food supply program within the limitations set by dietary habits and social environment. Second, more modern experience suggests that central bodies, such as FAO which holds the responsibility for guiding the distribution of food internationally, must be influenced not only by such statistics as are available but also by evidence, which they may well need to collect for themselves, of the nutritional health of the different groups of the populations whose rehabilitation will, for the next few years, be their primary task.

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# Nutritional Policies in Great Britain, 1939-46[1]

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IN THE 1914-18 war, nutrition was not considered as a subject for government policy until almost too late, but in 1939, the situation was fortunately very different. Between the two wars, owing both to the need which became apparent in World War I and the growth of nutritional knowledge of all kinds—laboratory, statistical, and social—interest in nutritional policy has increased, and many committees were set up to consider nutritional problems. The findings of all of these committees, and also such publications as Sir John Orr's *Food, Health, and Income* produced a fund of information on which the Food (Defense Plans) Department of the Board of Trade (the predecessor of the Ministry of Food) was able to draw as it became increasingly clear in the critical years of 1937–39 that sound plans must be evolved.

Table 1 shows how this scientific planning brought about changes which did not occur during the 1914 war in the consumption of certain nutritionally important foods.

The prewar work had shown that, although a sufficient quantity of foods was available in 1939, had distribution been equitable in respect to calories and protein, it was inadequate in respect to calcium. Also, there was a marginal deficiency of vitamin A, ascorbic acid, and thiamine. The deficiency of thiamine was made more serious by the widespread prewar consumption of white flour and sugar. In addition, it was known that the prewar supplies had not been equitably distributed.

Table 2 shows the estimated food supplies which have been available for civilian consumption during the last six and a half years and before the war. This table shows clearly that the changes which have occurred during the war have all tended toward dullness and lack of palatability. This trend is particularly apparent in the supplies of meat, fats, sugar, and fruit.

These changes have, of course, been caused by the necessity of reducing imports of food to about half their prewar weight. The total caloric supply, however, has been maintained throughout the war at something approaching the prewar level by greatly increasing the home production of such foods as potatoes and grains, and importing mainly foods of high caloric value, such as grains, fats, dried eggs and dried milk, and boned meat. These changes have had important effects on the food habits of the whole population and have necessitated the widespread food educational program which has been carried out by the British Government. This program was conducted in the press and by posters, over the radio, and by lectures and demonstrations and was designed not only to teach the housewife and others responsible for food service how to use new and unfamiliar foods, but also the most efficient and scientifically most acceptable methods of cooking and storing all foods. An interesting example of this originated from our increased dependence on green vegetables as a source of ascorbic acid. A considerable amount of research was carried out on the stability of ascorbic acid, and when the most reliable storing and cookery methods were established, they were publicized widely and with a large measure of success.

The nutritive values of the available foods are given in Table 3 and are compared with the estimated requirements. It will be seen, then, that the principal nutritional changes occurring in the English dietary between 1938 and 1946 were an initial drop in the levels of almost all nutrients in 1940 and 1941 which was followed by a gradual rise in calcium, iron,

TABLE 1

*Change in the consumption of certain foods in the United Kingdom during the last two wars*

| FOODS | CONSUMPTION IN 1914 AS COMPARED TO 1909–13 | CONSUMPTION IN 1943–44 AS COMPARED TO 1934–38 |
|---|---|---|
| | % | % |
| Milk | −26 | +28 |
| Eggs | −40 | −6 |
| Meat | −27 | −21 |
| Vegetables | −9 | +34 |

[1] Presented at the 29th Annual Meeting of the American Dietetic Association, October 18, 1946, in Cincinnati.

TABLE 2

*Changes in estimated supplies* moving into civilian consumption in the United Kingdom*

| PERIOD | DAIRY PRODUCTS** | MEATS† | POULTRY, GAME, FISH† | EGG AND EGG PRODUCTS†† | FATS AND OILS‡ | SUGAR AND SIRUP‡‡ | POTATOES | PULSES AND NUTS | TOMATOES AND CITRUS FRUITS§ | OTHER FRUITS | LEAFY, GREEN AND YELLOW VEGETABLES | OTHER VEGETABLES | GRAIN PRODUCTS | BEVERAGES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* | *lb.* |
| Prewar | 38.2 | 109.5 | 32.8 | 24.4 | 45.5 | 109.8 | 176.0 | 9.6 | 46.3 | 95.0 | 70.2 | 37.4 | 210.5 | 14.7 |
| 1940 | 38.3 | 98.7 | 22.7 | 22.5 | 41.2 | 77.6 | 172.2 | 6.9 | 44.9 | 76.1 | 73.1 | 25.4 | 226.2 | 15.6 |
| 1941 | 40.6 | 85.5 | 20.0 | 18.4 | 40.0 | 70.9 | 195.2 | 7.5 | 17.2 | 47.8 | 79.9 | 29.2 | 256.5 | 14.6 |
| 1942 | 48.3 | 89.5 | 20.5 | 21.1 | 40.1 | 72.1 | 233.7 | 6.4 | 25.4 | 72.9 | 89.5 | 30.0 | 244.9 | 14.0 |
| 1943 | 49.5 | 85.8 | 21.5 | 22.3 | 38.3 | 71.6 | 257.8 | 6.6 | 22.7 | 63.0 | 83.0 | 32.7 | 247.8 | 11.6 |
| 1944 | 48.7 | 95.2 | 23.5 | 23.7 | 38.9 | 75.6 | 282.2 | 7.5 | 31.4 | 68.6 | 88.1 | 36.8 | 251.1 | 12.8 |
| 1945 | 49.8 | 84.4 | 27.1 | 24.9 | 37.0 | 74.3 | 278.1 | 7.0 | 32.6 | 60.5 | 85.4 | 37.3 | 250.6 | 13.6 |
| 1946, January–June§§ | 50.4 | 81.6 | 34.5 | 22.7 | 36.2 | 73.8 | 300.6 | 5.9 | 27.1 | 40.4 | 76.1 | 33.4 | 254.5 | 14.4 |
| Per cent of prewar.. | 132 | 74 | 105 | 93 | 80 | 67 | 171 | 61 | 58 | 42 | 108 | 89 | 121 | 98 |

* Lb. per person per year.
** Total as milk solids.
† As edible weight.
†† Fresh egg equivalent.
‡ Fat content.
‡‡ Sugar content.
§ Fresh equivalent.
§§ Provisional estimates.

TABLE 3

*Nutrients available for civilian consumption in the United Kingdom for capita compared with estimated requirements*

| PERIOD | CALORIES | PROTEIN | | FAT | CARBOHYDRATE | CALCIUM | IRON | VITAMIN A | THIAMINE | RIBOFLAVIN | NICOTINIC ACID | ASCORBIC ACID** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Animal | Total | | | | | | | | | |
| | | *gm.* | *gm.* | *gm.* | *gm.* | *mg.* | *mg.* | *I.U.* | *mg.* | *mg.* | *mg.* | *mg.* |
| Prewar | 3005 | 43 | 80 | 130 | 378 | 693 | 12 | 4000 | 1.2 | 1.6 | 13 | 96 |
| 1940 | 2809 | 38 | 79 | 121 | 352 | 677 | 13 | 3700 | 1.3 | 1.6 | 14 | 89 |
| 1941 | 2823 | 36 | 82 | 113 | 368 | 699 | 13 | 3600 | 1.4 | 1.6 | 13 | 83 |
| 1942 | 2880 | 40 | 87 | 119 | 365 | 836 | 16 | 3800 | 1.7 | 2.0 | 14 | 98 |
| 1943 | 2862 | 40 | 86 | 115 | 370 | 1029 | 16 | 3600 | 1.9 | 2.0 | 14 | 99 |
| 1944 | 3007 | 41 | 88 | 124 | 387 | 1036 | 16 | 3800 | 2.0 | 2.1 | 16 | 108 |
| 1945 | 2912 | 41 | 88 | 115 | 380 | 1038 | 15 | 3700 | 1.8 | 1.8 | 15 | 109 |
| 1946, January–June* | 2900 | 43 | 90 | 111 | 385 | 1035 | 17 | 3400 | 1.8 | 1.8 | 16 | 108 |
| Estimated requirements..... | 2546 | | 65 | | | 750–910 | 9.3–11.7 | 3660–4660 | 1.0–1.3 | 1.2–1.6 | 9–12 | 57–71 |

* Provisional estimates.
** No allowances made in the supply figures for losses due to staling and cooking of vegetables and fruit.

B-complex vitamins, and ascorbic acid. The total caloric value of the diet rose gradually and reached its prewar level in 1944, but has subsequently fallen. The table shows clearly the changing quality of the British diet, caused by the reduction of animal protein and fat. All of the changes reflect a less palatable and less attractive diet. The increases in iron and the B-complex vitamins are caused almost entirely by the increased extraction of flour; the increase in calcium supplies, although resulting partly from a net increase in the consumption of dairy products, may be attributed largely to the addition of calcium carbonate to flour; and the initial fall in ascorbic acid at the beginning of the war was caused by the virtual cessation of fruit imports, for which at first there was no compensation by increased vegetable production. The subsequent rise after 1942 was more apparent than real because as vegetables were substituted more and more for fruit, there was more serious destruction of the vitamin during cooking.

The amount of fat available, of course, has an important bearing on caloric consumption. When there is a shortage of fat, it follows that the bulkiness of the day's food must increase. Furthermore, without fat, other foods which may be available are rendered less palatable and may, if the stringency

becomes unduly severe, actually remain uneaten. It is fairly certain, for example, that it would have been possible for the people to eat more potatoes and bread during the winter of 1940–41 when the overall caloric position was most serious had more fat been available to eat with these "buffer" foods.

Dietary fat can be classified under two heads, "visible" fat, comprising butter, margarine, and cooking fat, and "invisible" fat, including the cream in milk and fat in meat and bacon. The total amount of fat, "visible" and "invisible," available per person per day before the war was 130 gm. In 1940 this figure fell to 121 gm. and by 1941 to 113 gm. This was one of the worst periods, and there is some evidence that, although bread was at that time unrationed, the tedium of the diet was such that people were not eating enough to meet their full caloric requirements. In the intervening years the fat position improved, but at the end of 1945 and in 1946 the situation deteriorated and only 111 gm. fat is now available per person per day.

As regards protein, although the total amount in the British diet throughout the war and up to the present time has not been unsatisfactory, the proportion from animal sources has always caused a certain amount of anxiety. Table 3 shows the average quantity of animal protein available. The figure has varied between 36 and 43 gm. and compares with about 60 gm. in the United States and Canada. The consumption of animal protein by particular groups within the population cannot be calculated accurately from the broad averages of national statistics, but calculations based on the rations and allowances of animal foods to which different groups are entitled can readily be made. On this basis it would appear that during the worst period of 1940–41, the amount of animal protein available to a normal adult was about 26 gm. a day, a figure which allows little margin above the estimated requirement for health of 25 gm. This figure has risen and is now about 28 gm. The quantities of animal protein available for the "vulnerable" groups (expectant and nursing mothers, infants, and children), except adolescents, have always been, and still are, adequate. Possibly the least satisfactory feature of our nutritional program has always been the quantity of animal protein available to adolescents. An attempt has been made to make additional provision for this group in the form of a milk-cocoa drink, composed principally of dried skim milk, for young people in factories, offices, and training centers. Cost of a cup has been at the most 1 penny, and it provides about 8 gm. protein. Unfortunately, the proportion of adolescents taking advantage of this scheme is small.

The basis of the Ministry of Food policy for food distribution has been an effort to maintain the total food supplies at a level sufficient to meet the total needs of the population and at the same time to control distribution in such a way that the specific nutritional requirements of the separate sections of the population shall be met. The policy has been carried out by means of the following overall measures:

(a) Rationing animal protein foods, such as meat, bacon, and cheese, on a more or less equal basis.

(b) Rationing fat on an equal basis.

(c) Rationing sugar and sweets on an equal basis.

(d) Rendering butter and margarine nutritionally interchangeable by adding vitamins A and D to the latter.

(e) Promoting the production, good cooking, and consumption of vegetables rich in vitamin A and ascorbic acid.

(f) Raising the extraction rate of flour from the prewar level of 70 per cent and subsequently to 75 per cent in the spring of 1941, to 85 per cent in March, 1942, to 82½ per cent and back to 80 per cent in 1944, to 90 per cent in July, 1946, and back to 85 per cent in September, 1946. These changes were made for supply reasons, but they were made in the light of all the modern knowledge of the composition of the wheat berry, so that flour containing the highest possible proportion of B vitamins and the lowest possible proportion of fiber was milled. This measure, of course, also increased the iron in the diet.

(g) Improving supplies of calcium by the distribution of milk according to physiological need and by the increased availability of milk solids, cheese, and dried skim milk, and the addition of calcium carbonate to flour.

(h) Leaving potatoes, flour, and bread unrationed as long as possible as "energy buffer" foods. It was, however, necessary to ration bread on July 21, 1946.

(i) Making provision for unrationed meals to be supplied to workers "on the job" as an alternative to a rigid scheme of differential rations.

A number of additional steps have been taken to protect the nutritional position of vulnerable groups:

(a) *Milk schemes.* Priority supplies of milk are available at reduced price or free for children up to the age of five years and to expectant mothers; priority supplies of milk are available at home at full price for other children up to eighteen years of age and to nursing mothers; the Milk-in-Schools Scheme, started in 1934, was considerably expanded, and a milk-cocoa drink was made available for adolescents in factories.

(b) *School meals.* Special rations were provided for meals to meet the nutritional needs of school children between five and fourteen years of age.

(c) *Egg distribution.* A priority supply of eggs was made available to children from six months to two years of age.

(d) *Cod liver oil.* An issue, now free of cost, is

TABLE 4

*Rations and food allocations in the United Kingdom in September, 1946*

| PERSONS | RATIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Bacon | Fat (all types) | Meat* | Cheese | Milk** | Eggs | Sugar | Jam | Bread |
| | oz. | oz. | oz. | oz. | oz. | oz. | oz. | oz. | oz. |
| Normal consumer | 0.4 | 1.0 | 2.3 | 0.3 | 5.7 | 0.6 | 1.1 | 0.6 | 9.0 |
| Manual workers | | | | | | | | | |
| Men | 0.4 | 1.0 | 2.3 | 0.3 | 5.7 | 0.6 | 1.1 | 0.6 | 15.0 |
| Women | 0.4 | 1.0 | 2.3 | 0.3 | 5.7 | 0.6 | 1.1 | 0.6 | 11.0 |
| Children | | | | | | | | | |
| Up to 12 months* | 0.4 | 1.0 | 1.1 | 0.3 | 40.0 | 0.6 | 1.1 | 0.6 | |
| 1–5 years | 0.4 | 1.0 | 1.1 | 0.3 | 20.0 | 0.6 | 1.1 | 0.6 | |
| 0–4 years | | | | | | | | | 5.0 |
| 4–11 years | | | | | | | | | 9.0 |
| 5–18 years | 0.4 | 1.0 | 2.3 | 0.3 | 10.0 | 0.6 | 1.1 | 0.6 | |
| 11–18 years | | | | | | | | | 13.0 |
| Expectant mothers* | 0.4 | 1.0 | 3.4 | 0.3 | 27.1 | 1.2 | 1.1 | 0.6 | 11.0 |

* Meat is rationed by value. In the table it has been assumed that 1d. buys 1 oz.

** Milk is issued by the pint. 1 pint = 20 oz.

made to all expectant mothers and to children up to the age of five years. Pregnant women may obtain vitamin A and D tablets in place of oil.

(e) *Concentrated orange juice.* A standardized preparation is provided for all expectant mothers and for children up to the age of five years. Fresh oranges are also available for children from time to time.

A general picture of the diet now available to different groups of consumers in Great Britain thus consists of:

(a) Equal rations of meat (except to children under five and expectant mothers), bacon, sugar, jam, and cheese (except to certain categories of heavy workers);

(b) Varying amounts of milk, bread, and other flour products;

(c) Unrationed supplies of vegetables, potatoes, and fish;

(d) Extra communal meals for industrial workers;

(e) Meals and milk for school children;

(f) Cod liver oil and orange juice for young children and expectant and nursing mothers;

(g) A blanket "points ration" covering a number of alternative canned goods and other items.

The rations in September, 1946, are shown in Table 4.

An attempt will now be made to assess some of the results of Britain's wartime nutritional policy. One of the most interesting effects of wartime control has been the narrowing of the gap in consumption between the families who spend least and those who spend most on food. This is well-marked for all rationed foodstuffs, but not as would be expected, for such unrationed foods as fish and fresh vegetables. A year or two ago a very informative calculation was made in regard to milk distribution. From the results of a prewar survey carried out in 1938–39, it was possible to compare the milk consumption at that time by families on different economic levels to milk consumption by similar families in 1943 according to the results of the Wartime Food Survey.

Retail purchases of milk in April–June were uniformly lower than the prewar purchases, but the differences between the quantities purchased by different expenditure groups were practically the same in 1943 as before the war. This is the season at which milk consumption restrictions were least severe, and the uniform reduction from the prewar level of purchases in each expenditure group resulted from the wartime rise in the prices both of milk and of other foods. The February–March figures showed, by contrast, the effect of the winter restrictions on consumption by depressing the purchases of the higher expenditure groups. In the highest group, the figure for milk was about 1 pt. per person lower than in April–June, while purchases of the lowest group were almost unchanged. Thus the restriction on the purchase of milk reduces the consumption of the higher income groups, concentrating on them the effects of the seasonal fluctuation in supplies. Milk supplied under the National Scheme, on the other hand, is free from seasonal fluctuations and serves to raise the consumption average of the lower expenditure groups. If school milk figures were included, the difference between the groups would be still further diminished, since there are relatively more school children in the lower groups. Thus differences in milk consumption still exist both between expenditure groups and social classes, but their extent has been materially narrowed by wartime policy.

The survey has also shown, interestingly, that new

and unfamiliar foods were at first taken up with greater ease by the higher expenditure groups. For example, shortly after dried eggs were introduced, the higher food expenditure group purchased over four times as much as the lower groups, though they bought less than twice as many shell eggs. This contrast probably results from the fact that prejudice and conservatism in food habits exert a stronger influence in the poorer families. Similar differences were seen in respect to other unfamiliar foods, particularly some of those imported under Lend-Lease and sold under the Points Rationing Scheme. These unfamiliar foods have, however, been gradually accepted by all classes, and the public outcry, which arose when it was announced in January, 1946, that dried egg allocations were to cease, sprang from all sectors of the population.

The effect of this wartime diet on the health of the nation has been shown in several different types of inquiry and is a striking justification for the nutritional policy. Except for temporary setbacks in 1940–41, the maternal mortality, the infant mortality, and neonatal and stillbirth rates have fallen steadily until they have reached the lowest levels ever recorded in Great Britain. Although a number of factors have influenced these rates, it is not unreasonable to attribute a part of the improvement to better nutrition.

Tuberculosis is a disease which is affected by nutrition and the incidence of which always increases during wartime. In the first world war the death rate from the disease increased from 1340 to 1698 per million of the population of the United Kingdom. Between 1938 and 1944, although the incidence of tuberculosis increased, the death rate decreased from 635 to 583 per million, after a temporary rise in 1940 to a figure of 699.

Anemia may be due to a number of causes, but among these may be dietary deficiency of iron, protein, calcium, ascorbic acid, or certain factors of the B-complex. During 1943, the British Medical Research Council studied the incidence of anemia in 16,000 people, and found that compared with prewar years, there had certainly been no increase and probably a decrease in the incidence of this disease, particularly in women and children. The use of high extraction flour, the increased consumption of vegetables, and the special measures taken to protect the health of expectant mothers and others almost certainly contributed to this improvement.

A number of investigations have been made on the condition of the teeth of school children, and it appears that here again a steady improvement occurred during the war. It seems probable that the national diet and particularly the more even distribution of priority milk has been a factor in this improvement. The distribution of cod liver oil was also designed to influence the national nutrition on this point.

During recent years a number of new clinical methods have been developed to detect the earliest signs of malnutrition. These tests have been applied in surveys and carried out in different parts of the country during the war, but the incidence to any significant degree of authenticated malnutrition has been conspicuously low.

And finally, studies of the heights and weights of school children have shown that the rates were well maintained throughout the war years and that the tendency to an improved rate of growth first observed before the war has in general been maintained and is being further improved. Studies of the weights of adults have shown no decrease except in persons of over middle age among whom a slight average fall has been recorded.

Our postwar aims include greatly increased education in nutrition and in food matters for school children, students, housewives, caterers, and cooks; investigations into the development and use of new foods, manufacturing processes, storage, and transport; the continuation of our National Milk and Welfare Food Services which have now become part, as allowances in kind, of our Family Allowance legislation; the continuation and expansion of the service of milk and meals at school; and a new attempt to make better nutritional provision to adolescent workers in factories and other places.

## *Work Caloric Requirements of Ruhr Miners*

Dr. David B. Dill, Harvard University, recently published in *Science* a report of work done during the war by H. A. Kraut and E. A. Muller, of the Kaiser Wilhelm Institute for Industrial Physiology, Dortmund, Germany. The German scientists studied the relation of food to output of the Ruhr coal miners during the war. They found that each miner required between 155 and 200 calories (or about three slices of bread) for each ton of coal produced. This was in addition to the 1600 to 1800 calories needed every day just to keep alive. Weight lost by the miners when increased output was achieved by bonuses of cigarettes but without the proper "work calories" showed that the increased output came from the "very substance of the body." Another study showed that lack of sufficient "work calories" resulted in about half the amount of peacetime work, so that it took two or three men to do the usual work of one.—*New York Times, December 8, 1946.*

# Nutritional Appraisal and Demonstration Program of the U. S. Public Health Service[1]

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THE Nutrition Section in the Bureau of State Services of the U. S. Public Health Service was organized just a little over a year ago. Much of the intervening time has been spent in organizational matters, in recruiting and training personnel, in obtaining necessary equipment and supplies, and in developing our laboratory and other methods. The program is still, to a considerable extent, in this developmental phase, and it is possible to present only some preliminary data based upon the field work which has been carried on. It is felt that perhaps a short discussion of the organization, purposes, and operational procedures, with a brief presentation of some of our findings, may be of interest.

The U. S. Public Health Service has long been interested in nutrition, and for many years has been engaged in research in this field. It has been felt for some time, however, that the basic research activities should be complemented by a demonstration program to show how the results of these investigations could be applied as a part of a public health program. An appropriation for this purpose was made, and the organization of the Nutrition Section was begun in July, 1945. The purposes of the organization were at that time stated as follows:

(a) To test, develop, and apply methods which can be applied by health officers for assessing human nutrition;

(b) To collect information on the prevalence of malnutrition;

(c) To apply basic nutrition research to the field;

(d) To collect information on the etiology and therapeusis of deficiency diseases particularly as it can be applied in the field;

(e) To conduct demonstration projects for training and educational purposes;

More briefly stated, the purpose is to do field studies on the prevalence of nutritional deficiency disease from a medical public health standpoint and to test and develop remedial and preventive measures of practical value to public health organizations.

Because our field contacts are primarily through state and local health departments, the Section was set up under the Bureau of State Services within the States Relations Division. However, a close working relationship is maintained with the Nutrition Section in the Division of Physiology of the National Institute of Health, headed by Dr. William H. Sebrell. Their support and consultation will continue to be invaluable in the development of this activity.

Figures 1 and 2 are brief organization and functional charts presented to give an understanding of the program and to clarify certain points which may arise later.

Each field unit works intimately with the official health organization, generally a county health department with a strong generalized health program. However, the local associations must depend upon the type of local health organization existing in the region. The presence of a strong and interested school board, as well as an interested college or university and agricultural organization, helps greatly in carrying out the program.

The staff of the central office, in addition to its function of general supervision and coordination of the nutrition programs of the field units, expects to develop a program of aid and consultation to state health departments and certain other agencies interested in nutrition. In fact, the basic purpose of the section, as a part of the States Relations Division, is to stimulate the further development of nutrition services within state and local health departments. Programs are being developed on a cooperative basis in a few states with the Department of Health, the medical school, and the U. S. Public Health Service participating.

In this connection, we believe that the state health department should actively engage in the medical and health aspects of nutrition. The eventual goal should be to have a division of nutrition headed by

[1] Presented at the 29th Annual Meeting of the American Dietetic Association, October 15, 1946, in Cincinnati.

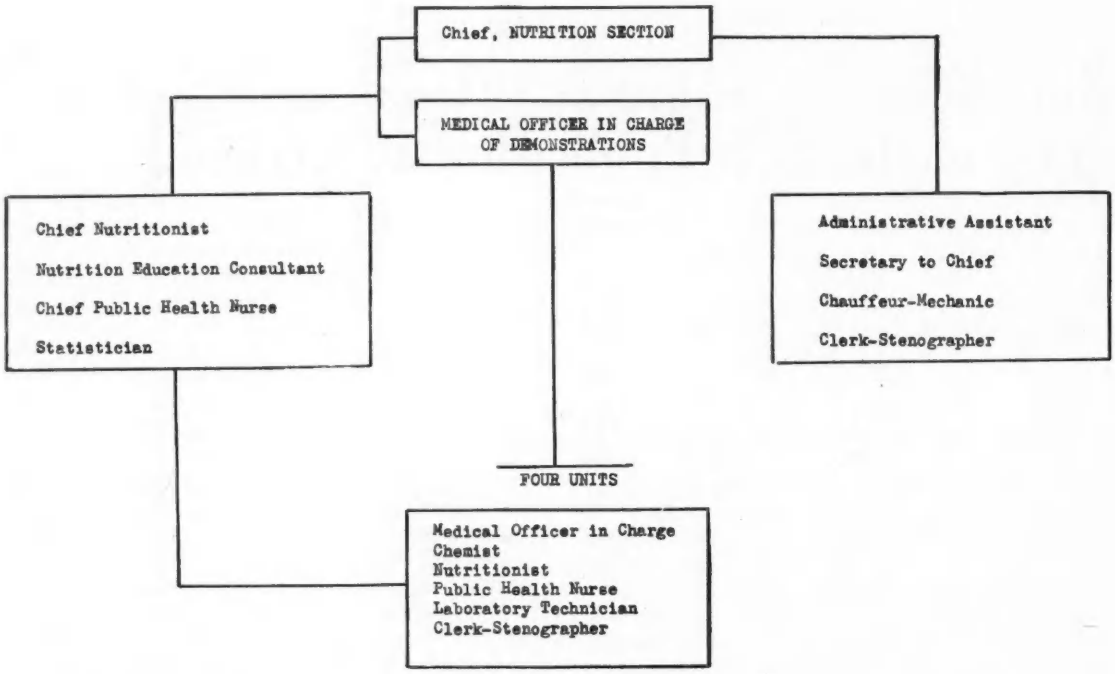


FIG. 1. *Organization chart*

a public health physician who has been trained in nutrition. Such a division should be on the same plane as other medical departments, such as epidemiology, maternal and child health, and industrial hygiene. This would in no way belittle the role of nutritionists in the state nutrition programs. They are, and will be, increasingly important in the operation of a public health nutrition program. Creation of such a division would enhance the value of the nutrition programs of state health departments by recognizing the medical aspects of nutrition problems. Each state health department should have access to a good nutrition laboratory headed by a competent biochemist, in order that a continuous program of investigation of malnutrition from a chemical standpoint could be carried on. Many, perhaps most, state departments are as yet unprepared for such a division, and those of us who are interested in such developments still have a long way to go in presenting a thoroughly practical public health nutrition program for health departments. We are convinced, however, that this should be the eventual goal and that there is already enough background and experience for a beginning to be made.

To date the primary efforts of our nutrition units have been to develop methods and to carry out appraisals on various population groups. A real effort is being made to combine a service program with the survey, not only because it aids in the success of the survey itself, but also because a survey without some service and follow-up has little positive value as far as stimulating improved nutrition in the community is concerned. This service and follow-up needs considerable amplification and development and will be given increasing attention.

Our first studies were done chiefly with school children because they were readily accessible, and the school agencies were especially cooperative. This seemed particularly desirable in the early stages of the development of the program when methods and procedures needed to be standardized. However, we are now emphasizing a family type study and have completed family studies in Georgia, Florida, and Michigan. This is the type of program which health departments are requesting. Problems in nutrition among other population groups, such as industry, will also be investigated. The program has, to a considerable extent, been planned for the rapid study of large groups. This does not preclude more concentrated and controlled studies involving fewer individuals; such studies are now under way in two of the demonstration units.

It may be of interest to present briefly our general pattern of operation in a demonstration. Each unit follows an essentially standardized procedure in order that data obtained from various parts of the country may be comparable. It must be realized, of course, that the detail and extent of each procedure is modified to suit the particular situation.

The family or individual to be examined is contacted by a member of the unit (the nurse or nu-

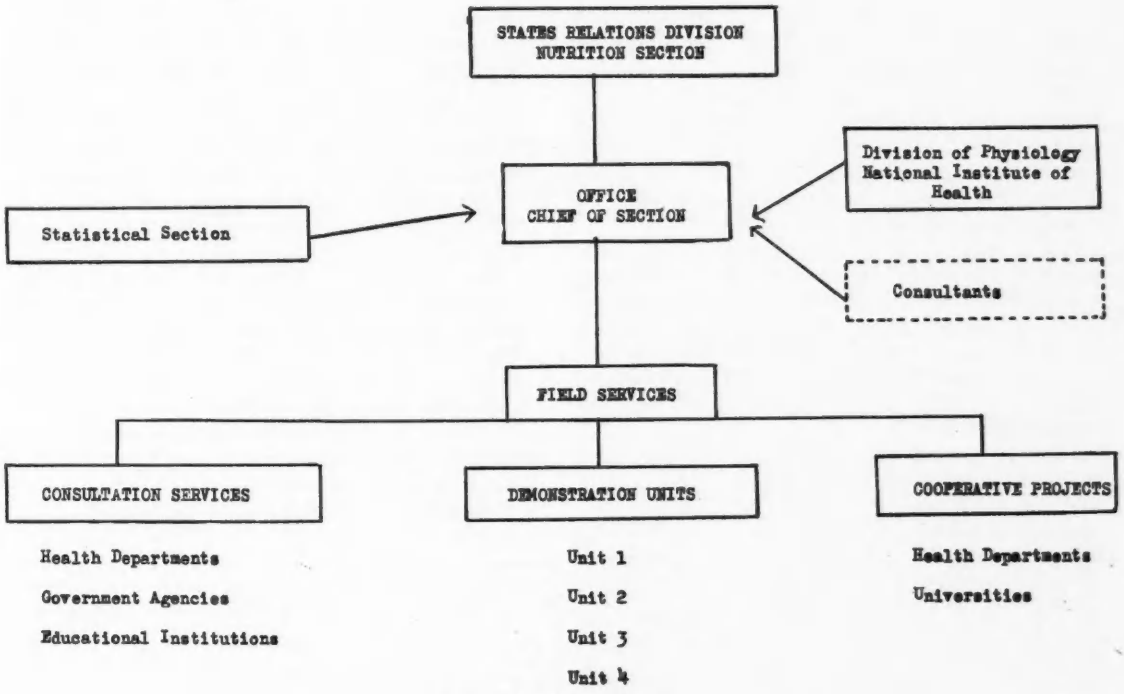


FIG. 2. *Functional chart*

tritionist) or preferably by a nurse of the local health department with whose cooperation the study is being made. The program is explained, cooperation solicited, and a clinic appointment made. A diet record form is left with the individual, and instructions for filling it out are given, so that a complete one-day record filled out during or after each meal may be brought to the clinic. When the individual reports to the clinic he is usually seen first by the nutritionist. She reviews the diet record in some detail and checks apparent inaccuracies and omissions to obtain additional information as needed on quantities of food eaten and methods of cooking. We believe this method is superior to the usual diet history in which the individual tries to remember food eaten during the previous 24-hr. period. In the main we have used one-day diet records for study of large groups with the conviction that such a record can be obtained accurately under our working conditions.

The question repeatedly arises whether it would not be preferable to obtain accurate weekly records on a smaller sample. The extra time consumed and probable home visits necessary to obtain an accurate seven-day diet record would be impossible for large numbers with the staff which is available. The taking of a diet record for each individual, followed by recommendations for improvement of his diet, is an important part of the service program. Furthermore, a larger number of accurately-taken one-day diet records may serve as useful a purpose as a much smaller number of seven-day records.

A system of coding has been worked out by which the servings of each food group on the diet record can be compared with the National Research Council recommendations. This takes only a few minutes, and from the individual's own record the nutritionist can immediately advise him what food groups should be increased to improve his dietary. Quantitative analysis of the records is, of course, necessary for final evaluation of the data, but such a calculation means little to the average individual and the above procedure enables us to give sound advice "on the spot." Of course, a one-day diet record, or for that matter, even a seven-day record, is not necessarily typical of the dietary for that particular individual, but such a one-day record may serve as a basis for nutritional advice and for analyzing the food habits of the group as a whole.

For examining large groups, the so-called complete physical has been abandoned in order to concentrate on the body areas which are most likely to show signs of possible deficiency. Fortunately, these signs, for the most part, appear on the exposed surfaces of the body, making it unnecessary to remove much clothing. This greatly speeds up the examination of large groups.

The examination may be extended if there are indications that the person has other physical ailments. In such an event, he is referred, through the health officer, to the physician of his choice.

In the more intensive and carefully controlled studies, a complete physical is made. It is realized that the abbreviated type of physical examination used may be open to some criticism for lack of thoroughness. However, after a considerable experience with both methods, it is felt that, in the examination of large groups, the short type yields the greatest return for the effort expended, and relatively little of interest nutritionally is lost.

Each unit is developing a reasonably well-equipped laboratory in which rather complicated chemical techniques are being developed and applied. In addition, each unit is also equipped with a trailer laboratory so that considerable chemical work can be performed at the time specimens are collected at locations which may be some distance from the central laboratory.

Thus far routine laboratory procedures have been confined to determinations of hemoglobin, hematocrit, and total plasma protein. The various micromethods developed by Bessey and Lowry are now being put to use in the field. The chief advantage of these methods is the ease with which blood samples can be obtained from large groups. In small intensive studies there is little difficulty in obtaining venous blood, but in rapid studies on large groups, the obtaining of consent and the taking of the sample is much easier if the determinations can be made on finger blood.

To illustrate the type of data collected, selected data on school children from Florida and Georgia have been summarized. In Alachua County, Florida, with the exception of a few refusals and absences, the entire school population was examined by the rapid physical method and were also tested for anemia. The following tables present three outstanding physical findings, namely, follicular conjunctivitis, skin folliculosis, and gingivitis, plus the hemoglobin values from this county and Dougherty County in southern Georgia.

One of the greatest needs in nutrition appraisals is greater understanding of what the various physical signs ordinarily accepted as evidence of nutritional deficiency mean. Some of these signs have been used as evidence of deficiency on the basis of limited evidence. Other signs are firmly established as results of malnutrition, but one may question whether most of them are pathognomonic. It must be remembered that factors other than dietary inadequacies, including poor hygiene, external irritants, physical agents, and disease, are either causative or contributory. These physical signs are, therefore, not presented as evidence of deficiency disease, but merely represent the prevalence of certain signs that may have nutritional significance, and whose collection and further elucidation may aid in determining the extent of the nutritional problem.

Table 1 shows the prevalence of these three physical findings by age. The first two, follicular conjunctivitis and folliculosis, are usually attributed to vitamin A deficiency. Both signs were prevalent to an equally high degree. One is impressed by the high prevalence of these two findings in Florida, particularly by the frequency and severity of follicular conjunctivitis. Almost an equally high prevalence has been observed in other parts of the country, but the degree of severity in this region was striking.

Do these findings mean that clinical vitamin A deficiency to such an extent exists? Some skepticism is probably indicated. It will be seen that there is a distinct tendency for follicular conjunctivitis to decrease with age, and for folliculosis to be highest at the age group ten to twelve years. It is, of course, possible that the sensitivity of the two tissues to vitamin A deficiency is different at various ages. It would be wise, however, to await further evidence before making such an assumption.

TABLE 1

*Prevalence according to age of follicular conjunctivitis, skin folliculosis, and gingivitis among school children in Alachua County, Florida**

| PHYSICAL FINDING | INCIDENCE | | | | | |
|---|---|---|---|---|---|---|
| | All ages | Under 7 | 7–9 | 10–12 | 13–15 | Over 16 |
| | % | % | % | % | % | % |
| Follicular conjunctivitis | 27.1 | 32.9 | 31.3 | 25.8 | 25.2 | 18.4 |
| Skin folliculosis | 27.1 | 16.5 | 27.4 | 31.6 | 27.4 | 26.3 |
| Gingivitis | 13.2 | 3.2 | 7.3 | 13.8 | 19.2 | 22.7 |
| Number of children tested | 6125 | 711 | 1630 | 1613 | 1476 | 695 |

* Courtesy Dr. Leonard M. Schuman, medical officer, Southeast Nutrition Unit, U. S. Public Health Service.

Is the large percentage of gingivitis an evidence of ascorbic acid deficiency in an orange-growing region? Possibly it is, since diet records show that a large percentage of persons fail to take advantage of available citrus fruits. Yet lower prevalence has been found where the situation with regard to available food sources of ascorbic acid was less favorable. Gingivitis shows a marked increase with increasing age. Does this mean that ascorbic acid deficiency is seven times as common above the age of fifteen as below the age of seven? Does the high incidence reflect many repeated periods of deficiency in the past not corrected by subsequent intakes? Possibly. Is the increase in gingivitis with age due to action of other factors associated with advancing age, such as repeated trauma, more gingival infections, and poor oral hygiene? These questions cannot be answered at present, but trends such as

these should at least make one suspicious of present assumptions and lead to further research.

Some further light may be shed on the etiology of these and other findings when the other data from this study are more completely analyzed. A controlled study involving more complete diet records, blood tests, and supplemental feeding is now being undertaken. These investigations should contribute to our understanding of the etiology of gingivitis, folliculosis, and conjunctivitis.

Table 2 shows no marked sex differences in the prevalence of these signs with the possible exceptions of a high prevalence in skin folliculosis and a lower rate of gingivitis in white females and a greater prevalence of follicular conjunctivitis in the Negro female over the male; nor are the color differences very striking. It is, perhaps, surprising that there are no more color differences, since there are differences in the diets of the white and Negro in the South. However, there is again a lack of parallelism in the two signs attributed to vitamin A deficiency; the follicular conjunctivitis tends to be lower in the Negro and the skin folliculosis higher.

TABLE 2

*Prevalence according to sex of follicular conjunctivitis, skin folliculosis, and gingivitis among school children in Alachua County, Florida**

| PHYSICAL FINDING | INCIDENCE | | | |
|---|---|---|---|---|
| | White | | Negro | |
| | Male | Female | Male | Female |
| | % | % | % | % |
| Follicular conjunctivitis | 28.8 | 29.6 | 21.8 | 26.0 |
| Skin folliculosis | 20.4 | 27.5 | 32.1 | 31.3 |
| Gingivitis | 14.5 | 11.5 | 13.3 | 13.7 |
| Number of children tested ... | 1764 | 1908 | 1129 | 1324 |

* Courtesy Dr. Leonard M. Schuman, medical officer, Southeast Nutrition Unit, U. S. Public Health Service.

In Table 3 is shown the change with time of year from late October, when examinations were begun, to February, when they were completed. The rise in skin folliculosis as winter advances is striking. This rise is well known. There are those who attribute it to a decrease in consumption of green and yellow vegetables in winter, while others attribute it to physical factors associated with colder weather. Likely both these and other causes are contributory. On the other hand, prevalence of follicular conjunctivitis falls at least in the early months of the year. These factors suggest that other factors may be influencing the development of these signs. The gingivitis shows no pronounced trend according to season.

Because of probable differences in the eating habits and environmental factors of city and country dwellers, the rural and city prevalence of these signs was compared and is shown in Table 4. It will be noted that there is little difference, with the possible exception of some decrease in follicular conjunctivitis, in rural areas. The town from which the city cases were taken was not large and more differences might be found if a large industrial city were compared with a strictly rural and farming area.

TABLE 3

*Prevalence by months of follicular conjunctivitis, skin folliculosis, and gingivitis among school children in Alachua County, Florida**

| PHYSICAL FINDING | INCIDENCE | | | | |
|---|---|---|---|---|---|
| | Total | Oct.–Nov. | Dec. | Jan. | Feb. |
| | % | % | % | % | % |
| Follicular conjunctivitis | 27.1 | 36.2 | 23.6 | 23.6 | 21.8 |
| Skin folliculosis | 27.1 | 17.7 | 29.3 | 31.2 | 34.7 |
| Gingivitis | 13.2 | 17.0 | 10.9 | 13.1 | 9.7 |
| Number of children tested.. | 6125 | 1844 | 1711 | 1725 | 845 |

* Courtesy Dr. Leonard M. Schuman, medical officer, Southeast Nutrition Unit, U. S. Public Health Service.

TABLE 4

*Prevalence by residence of follicular conjunctivitis, skin folliculosis, and gingivitis among school children in Alachua County, Florida**

| PHYSICAL FINDING | INCIDENCE | |
|---|---|---|
| | City (county seat) | Rural (rest of county) |
| | % | % |
| Follicular conjunctivitis | 29.9 | 24.7 |
| Skin folliculosis | 26.7 | 27.4 |
| Gingivitis | 13.2 | 13.1 |
| Number of children tested..... | 2815 | 3310 |

* Courtesy Dr. Leonard M. Schuman, medical officer, Southeast Nutrition Unit, U. S. Public Health Service.

Tables 5 and 6 summarize the hemoglobin values of more than nine thousand school children in Florida and Georgia. There appear to be three striking trends in these tables, none of them particularly new but all in need of re-emphasis. First, the gradual rise in hemoglobin with age. This has been reported frequently and shows the fallacy of trying to set a single normal level even for school children, a level below which an individual is to be regarded as anemic, much less malnourished. A second feature is the equality of the hemoglobins for both sexes up to the age of adolescence. The difference

TABLE 5

*Hemoglobin values by age, sex, and color among school children in Alachua County, Florida*

| AGE IN YEARS | WHITE | | | | NEGRO | | | |
|---|---|---|---|---|---|---|---|---|
| | No. of children | | Median Hb. | | No. of children | | Median Hb. | |
| | Male | Female | Male | Female | Male | Female | Male | Female |
| | | | *gm. per 100 cc.* | *gm. per 100 cc.* | | | *gm. per 100 cc.* | *gm. per 100 cc.* |
| All ages | 1718 | 1857 | 12.9 | 12.7 | 1140 | 1350 | 11.8 | 11.8 |
| Under 7 | 200 | 189 | 11.9 | 11.9 | 159 | 147 | 11.3 | 11.3 |
| 7 to 9 | 442 | 496 | 12.4 | 12.4 | 335 | 382 | 11.6 | 11.6 |
| 10 to 12 | 449 | 468 | 12.8 | 12.7 | 314 | 365 | 11.8 | 11.9 |
| 13 to 15 | 448 | 446 | 13.4 | 13.0 | 248 | 291 | 12.2 | 12.0 |
| 16 and over | 179 | 258 | 14.6 | 13.0 | 84 | 165 | 13.3 | 11.9 |

thereafter appears to be due to a continued rise with age in the males while the female values remain at approximately the adolescent level. At thirteen to fifteen years there is a slight increase in the male values over the female, while at sixteen years and over the difference between the sexes is 1 or 2 gm. The third outstanding feature is that the Negroes average approximately 1 gm. lower than the whites. Probably some of this may be attributed to the poorer general health and in some respects poorer nutrition of the Negro, but one wonders whether it may not be partially a racial difference.

Although the average values are somewhat below those often considered normal, they compare favorably with certain studies in other areas of the country. Studies on school children in Michigan and Maryland, although somewhat less extensive in scope, show similar specific age values. Thus, the studies do not support a common belief in characteristically lower normal hemoglobin values in the South. It should be mentioned that both these counties were among the better in this region, both economically and from a public health standpoint, and that neither malaria nor hookworm was a major problem in either county. The prevalence of very low hemoglobins (below 10 gm.) was not high, averaging less than 2 per cent in the whites, and approximately 4 per cent in the Negroes, in both the city and rural areas.

In Table 7 is shown the "Prevalence of school children having hemoglobin values below 12.0 gm. by age, sex, and color, school year 1945–46." Hemoglobin values below 12.0 gm. fall outside the usually accepted normal value for the age studied and, pending further information, are considered

TABLE 6

*Hemoglobin values by age, sex, and color among school children in Dougherty County, Georgia*

| AGE IN YEARS | WHITE | | | | NEGRO | | | |
|---|---|---|---|---|---|---|---|---|
| | No. of children | | Median Hb. | | No. of children | | Median Hb. | |
| | Male | Female | Male | Female | Male | Female | Male | Female |
| | | | *gm. per 100 cc.* | *gm. per 100 cc.* | | | *gm. per 100 cc.* | *gm. per 100 cc.* |
| All ages | 678 | 705 | 13.2 | 12.9 | 997 | 1241 | 11.7 | 11.8 |
| Under 7 | 74 | 66 | 12.4 | 12.4 | 103 | 127 | 11.3 | 11.4 |
| 7 to 9 | 189 | 160 | 12.8 | 12.7 | 324 | 340 | 11.4 | 11.5 |
| 10 to 12 | 133 | 155 | 12.9 | 12.8 | 292 | 319 | 11.6 | 11.8 |
| 13 to 15 | 181 | 213 | 13.7 | 13.1 | 208 | 310 | 12.5 | 12.1 |
| 16 and over | 101 | 111 | 14.6 | 12.9 | 70 | 145 | 13.0 | 12.1 |

abnormal in this report. If this standard is accepted, the data presented show a relatively high prevalence of anemia in the white group and a very high prevalence in the colored group. Percentages below 12.0 gm. in the white children under thirteen years range from 19 to 37 per cent in the males and 24 to 35 per cent in the females. In the Negroes, the percentages are much more striking, with percentages of 64 to 76 in the males below thirteen years, and 61 to 74 in the females. The high percentages of children with hemoglobin levels below the normal value in the area studied indicate that an important problem in anemia exists in school children.

In conclusion, the organizational plan and activities of the Nutrition Section of the U. S. Public Health Service have been briefly described. The data presented have been limited to our study in the southeastern area of the United States. Subsequent reports will describe in detail the methodology used in assessing nutritional status. In addition, the reports will include data on the prevalence of signs usually associated with deficiency disease and dietary and laboratory findings in the several regional areas in which the field units are located.

TABLE 7

*Prevalence of school children having hemoglobin values below 12.0 gm. by age, sex, and color, school year 1945–46*

| PLACE* | NO. OF CHILDREN | | HB. BELOW 12.0 GM. PER 100 CC. | | | |
|---|---|---|---|---|---|---|
| | | | Male | | Female | |
| | Male | Female | Under 13 | Over 13 | Under 13 | Over 13 |
| **White** | | | | | | |
| | | | % | % | % | % |
| Albany, Ga. | 678 | 705 | 19.4 | 3.2 | 24.7 | 10.8 |
| Gainesville, Fla. | 898 | 897 | 30.2 | 9.4 | 25.4 | 19.3 |
| Alachua County, Fla.* | 820 | 870 | 37.2 | 9.1 | 34.8 | 10.5 |
| **Negro** | | | | | | |
| Albany, Ga. | 799 | 1009 | 66.9 | 16.3 | 61.2 | 29.4 |
| Dougherty County, Ga.** | 198 | 232 | 75.9 | 56.3 | 73.5 | 70.2 |
| Gainesville, Fla. | 393 | 488 | 64.5 | 32.1 | 63.7 | 46.9 |
| Alachua County, Fla.* | 747 | 862 | 65.0 | 35.9 | 63.0 | 53.1 |

* Exclusive of Gainesville, Fla.
** Exclusive of Albany, Ga.

## TRYPTOPHANE REQUIREMENT

In a paper read at the Symposium of the Nutrition Foundation, Inc., in New York, on November 13, 1946, Dr. William C. Rose, Department of Chemistry, University of Illinois, stated that a tentative figure for the tryptophane requirement of man has been established. Careful tests in two subjects have yielded identical results. In each, the minimum level compatible with consistent nitrogen equilibrium proved to be 0.15 gm. per day. Dr. Rose cautioned that it would not be a safe procedure to recommend the minimum intake of any dietary component, since some variation in the requirement may occur in different individuals. In all probability the daily intakes which will be recommended will exceed the minimum by 100 per cent, to provide a sufficient "factor of safety," at least in normal individuals. That this is true of tryptophane is shown by the fact that eighteen persons have been kept in nitrogen balance with daily intakes of 0.3 gm. or less.

The following table has been prepared to show the approximate quantities of generally used foods needed to furnish 0.3 gm. of tryptophane.

| FOOD | QUANTITY |
|---|---|
| Whole milk | 650 cc. |
| Whole eggs | 150 gm. |
| Calf liver | 100 gm. |
| Lean beef | 145 gm. |
| White bread | 275 gm. |
| Cooked rolled oats | 850 gm. |

# The Dietary Management of Spontaneous Hypoglycemia[1]

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SPONTANEOUS hypoglycemia is not a disease. It is simply a manifestation of a derangement in the metabolism of carbohydrate. Since normoglycemia is dependent upon a finely balanced functional integration of many organs (islets of Langerhans, pituitary and adrenal glands, liver, kidneys, central and autonomic nervous systems, and others), it is evident that the etiology of spontaneous hypoglycemia, and consequently the mechanisms by which it is produced, are extremely variable. These facts are of greatest importance with regard to proper management of the individual patient suffering from periodic spontaneous hypoglycemia, for rational and successful treatment is dependent wholly upon establishing the correct etiological diagnosis.

A discussion of differential criteria by which specific etiology is determined may be found elsewhere (1). However, some insight into the magnitude of the problem is gleaned from a glimpse at the following list of abnormalities, any one of which is capable of producing symptomatic hypoglycemia.

*Etiological Classification of Spontaneous Hypoglycemia*

I. Organic—recognizable anatomic lesion
  A. Hyperinsulinism
    1. Pancreatic island cell adenoma
      (a) Single
      (b) Multiple
      (c) Aberrant
    2. Pancreatic island cell carcinoma
      (a) Localized
      (b) With metastases
    3. Generalized hypertrophy and hyperplasia of the islets of Langerhans
  B. Hepatic disease
    1. Ascending infectious cholangitis
    2. Toxic hepatitis
    3. Diffuse carcinomatosis
    4. Fatty degeneration, "fatty metamorphosis"
    5. Glycogenosis (von Gierke's disease)
  C. Pituitary hypofunction (anterior lobe)
    1. Destructive lesions (chromophobe tumors, cysts, etc.)
    2. Atrophy and degeneration (Simmond's disease)
    3. Thyroid hypofunction (? secondary to pituitary hypofunction)
  D. Adrenal hypofunction (cortex)
    1. Idiopathic cortical atrophy
    2. Destructive infectious granulomas
    3. Destructive neoplasms
  E. Central nervous system lesions (hypothalamus or brain stem; interference with nervous control of blood sugar)

II. Functional—no recognized anatomic lesion but explainable on basis of unusual somatic function
  A. Hyperinsulinism (imbalance of the autonomic nervous system)
    1. "Hypoglycemic fatigue"
    2. "Nervous hypoglycemia"
    3. "Functional hypoglycemia"
    4. "Reactive hypoglycemia", etc.
  B. Alimentary hyperinsulinism (rapid intestinal absorption)
    1. Post gastro-enterostomy
    2. Post gastric resection (partial or total)
  C. Renal glycosuria (severe degrees of low renal threshold for dextrose)
  D. Lactation
  E. Severe continuous muscular work

III. Miscellaneous
  A. Factitious or surreptitious insulin administration
  B. Post-operative hypoglycemia
  C. Severe inanition
  D. Unknown

The hypoglycemia which is frequently associated with the various diseases shown above must be managed, in most instances, by dietary means. But there is no *single* dietary regimen which can be applied with success to *all* patients who manifest periodic depressions of the blood sugar level. A dietary program which is highly successful in one

[1] Presented at the 29th Annual Meeting of the American Dietetic Association on October 17, 1946, in Cincinnati.

type of spontaneous hypoglycemia may intensify greatly the other types of hypoglycemia, which, in turn, respond well to other forms of dietary management. Thus, we are obliged to turn again to the etiology and mechanism of the hypoglycemia in question in order to prescribe dietary management.

From the viewpoint of the mechanism of production and of the type of dietary management indicated in the various hypoglycemic states, the author has found it convenient and helpful to classify the different causes under two main headings, namely, the stimulative hypoglycemias and the fasting hypoglycemias.

### STIMULATIVE HYPOGLYCEMIA

That the normal postprandial elevation of the blood sugar level constitutes a stimulus to the islets of Langerhans for the liberation of increased amounts of insulin has been well established (2, 3). Thus, normal individuals often demonstrate a somewhat lower level of blood sugar 1½ to 3 hr. after the ingestion of dextrose, than they showed in the post-absorptive state (before taking the glucose). The absorption of glucose has stimulated a mechanism which rapidly clears the blood of absorbed (and absorbing) glucose. When this mechanism is either excessively sensitive to the normal stimulus (functional hyperinsulinism) or excessively stimulated by an abnormally high absorptive hyperglycemia (alimentary functional hyperinsulinism), a sharp fall of the blood sugar level occurs secondary to the stimulus. It is obvious that an attempt to control this type of spontaneous hypoglycemia with a high carbohydrate diet will meet with no success. In fact, such management is likely to produce more frequent and more severe attacks.

Functional hyperinsulinism is a clearly defined example of a stimulative type of hypoglycemia (4). It is the most common cause of spontaneous hypoglycemia, accounting for about 70 per cent of all of the cases in which clinical symptoms are produced by an abnormally low level of the blood sugar. Characteristic of this condition are the following points: (a) the fasting blood sugar is always normal and no hypoglycemic attacks are experienced *before* breakfast; (b) attacks occur postprandially (2 to 4 hr. after meals) and are most common in the forenoon and late afternoon; (c) fasting or omission of meals does not precipitate episodes of hypoglycemia; and (d) the oral glucose tolerance curve is typical (Fig. 1) in that it begins with a normal fasting blood sugar level, shows a normal or somewhat subnormal absorptive elevation of blood sugar, and then falls precipitously to hypoglycemic levels. Thus, it requires the stimulative effect of absorption of carbohydrate to produce the secondary hypoglycemia which follows. For reasons outlined elsewhere (1), we believe that the condition represents an excessive responsiveness of histologically normal pancreatic islet cells to the normal stimulus for insulogenesis.

In the early dietary management of this syndrome it soon became apparent that a postprandial elevation of the blood sugar was to be avoided since it constituted the trigger which fired the hypoglycemia-producing mechanism. In 1931, therefore, Waters (5) introduced the use of a low-carbohydrate diet.

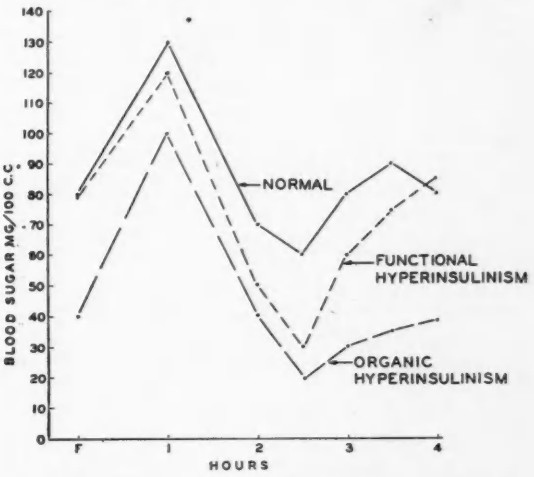


FIG. 1. *Dextrose tolerance test (standard dietary preparation)*

The clinical results were better, but the regimen required a frequent feeding schedule. John's (6) demonstration that a small dose of insulin so administered as to prevent an absorptive hyperglycemia also prevented the secondary hypoglycemia as well, gave added support to the *modus operandi* but had obvious therapeutic disadvantages.

In 1936 the writer reported experimental and clinical evidence indicating the additional advantages to be derived from a diet containing large amounts of protein (7) and introduced the use of the high-protein, low-carbohydrate diet. Figures 2, 3, and 4 illustrate the metabolic principle upon which the high-protein, low-carbohydrate regimen is based. Protein during its metabolism yields approximately 50 per cent of its weight as glucose. Yet in normals (Fig. 2), patients with functional hyperinsulinism (Fig. 3), and even in the average diabetic (Fig. 4), no significant rise in the blood sugar level is demonstrable after the ingestion of protein (8). Note that with equivalent yields of glucose from protein on the one hand and from carbohydrate on the other, the blood sugar time curves are entirely different. Carbohydrate is absorbed quickly and directly into the blood stream producing a rapid initial elevation of the blood sugar and in functional hyperinsulinism a secondary hypoglycemia (Fig. 3). Protein is split in the intestinal tract and absorbed into the blood as amino acids.

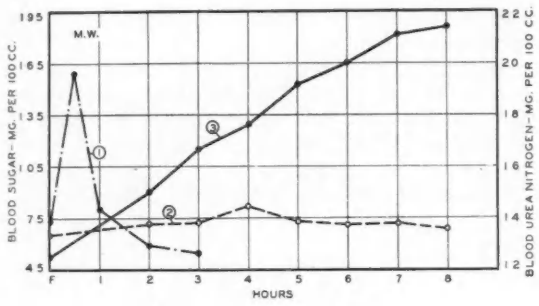


FIG. 2. *Normal subject.*

LEGEND
1 = blood sugar after 66 gm. glucose
2 = blood sugar after 600 gm. lean beef (132 gm. protein) (66 gm. available glucose)
3 = blood urea nitrogen after 600 gm. lean beef (132 gm. protein)

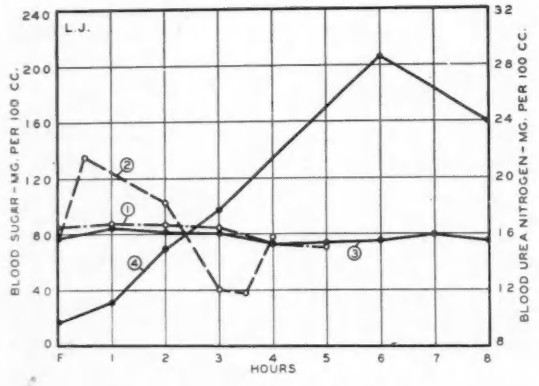


FIG. 3. *Functional hyperinsulinism.*

LEGEND
1 = blood sugar fasting (test begun after 12-hr. fast)
2 = blood sugar after 59 gm. glucose
3 = blood sugar after 545 gm. lean beef (120 gm. protein) (60 gm. available glucose)
4 = blood urea nitrogen after 545 gm. lean beef (120 gm. protein)

In the liver the glycogenic amino acids are deaminized and converted to glucose. That this is a slow and even process is indicated by the prolonged, steady rise of the blood urea nitrogen levels after the ingestion of protein. The release of glucose is thus sufficiently slow that an elevation of the blood sugar does not occur. Consequently, a secondary hypoglycemia is not produced even though an amount of glucose has been added to the body from a protein precursor which is equal to a hypoglycemia-producing dose when given as carbohydrate.

This principle has since been confirmed experimentally by Thorn (9). Many workers (10–16) have reported recently upon the therapeutic efficacy of the high-protein, low-carbohydrate regimen in the management of functional hyperinsulinism. Our own results continue to be good. The average case responds promptly and completely after two or three days of dietary control. We use a three-meal program prescribing as much protein as the patient can comfortably handle. This averages about 120 to 140 gm. per day. The carbohydrate is initially limited to between 50 and 75 gm. and is divided evenly among the three meals. The remaining calories required for maintenance are supplied by fat. Beeuwkes (17) has reported upon the dietetic aspects of this regimen.

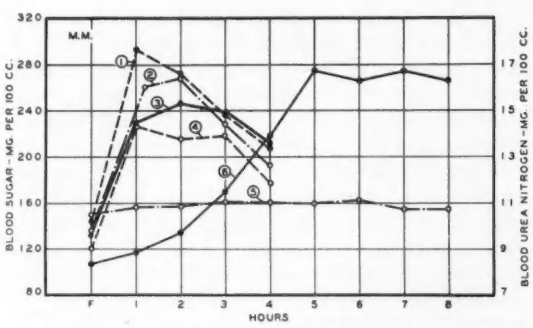


FIG. 4. *Diabetes mellitus.*

LEGEND
1 = blood sugar after 68 gm. glucose
2 = blood sugar after 370 gm. potato, 25 gm. butter (68 gm. available glucose)
3 = blood sugar after 118 gm. bread, 25 gm. butter (68 gm. available glucose)
4 = blood sugar after 300 gm. banana (raw) (68 gm. available glucose)
5 = blood sugar after 618 gm. lean beef (136 gm. protein) (68 gm. available glucose)
6 = blood urea nitrogen after 618 gm. lean beef (136 gm. protein)

Allied mechanistically to functional hyperinsulinism in that it, too, is a stimulative type of hypoglycemia, is a condition which has arisen with the advent of modern gastric surgery. We have classified it under the term alimentary functional hyperinsulinism. Any surgical procedure which removes the gastric pylorus from the gastrointestinal circuit (gastro-enterostomy, partial or total gastrectomy) and which allows rapid delivery of food into the small bowel produces a situation which is likely to lead to periodic spontaneous hypoglycemia (18–20). Here again the fasting blood sugar level is normal. Food is dumped with excessive rapidity upon the absorbing surfaces of the small intestine. This results in an unusually rapid absorption of carbohydrate and in a pathologically high initial absorptive hyperglycemia (Fig. 5). This constitutes an excessive stimulus to normally responsive pancreatic islets and a very sharp secondary hypoglycemia occurs. Therapy in this condition must be aimed at preventing an *excessive* absorptive hyperglycemia. A *normal* absorptive hyperglycemia does not cause secondary hypoglycemia in this group since the islets are quite normal in their response to stimulation. The high-protein, low-carbohydrate diet is effective in reliev-

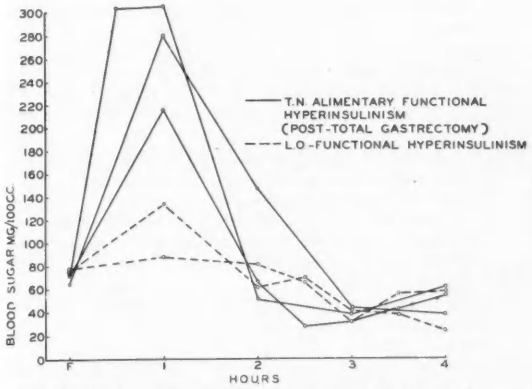


FIG. 5. *Blood sugar levels in alimentary functional hyperinsulinism in Subject* T. N. *vs. functional hyperinsulinism in Subject* L. O. *(repeated oral dextrose tolerance tests with standard dietary preparation).*

ing symptoms in this condition, as well as in the group of primary functional hyperinsulinism cases.

Organic hyperinsulinism (pancreatic insuloma) may be classified as producing a stimulative type of hypoglycemia. But, in addition, it evidences elements which are characteristic of the fasting hypoglycemias. This unusual condition will be discussed under a separate heading.

### FASTING HYPOGLYCEMIA

Those conditions, which are characterized by an abnormally low fasting blood sugar level and in which the hypoglycemia is intensified by restriction of carbohydrate or by fasting, are more easily understood. Into this group fall the following causes of spontaneous hypoglycemia: hepatogenic hypoglycemia, hypopituitarism, adrenal cortical hypoglycemia, and prolonged inanition. In all, the fasting hypoglycemia results from an unavailability of sufficient carbohydrate to support tissue requirements for oxidation over any prolonged period of time without food. The mechanism may vary, but the result is the same. For example, in hypopituitarism and in Addison's disease, tissue requirements for glucose are increased and glyconeogenesis from protein is diminished. Thus, after the usual overnight fasting period, the blood sugar is likely to be low. Omission of meals or restriction of carbohydrate produces more severe hypoglycemia. In renal glycosuria and in lactation with hypoglycemia, glucose is either lost from the body or converted to something else. Impairment of the normal glycogenic and glycogenolytic functions of the liver leads inevitably to a fasting type of hypoglycemia (21). In all of these conditions a diet *high* both in carbohydrate and in protein is indicated. Of greatest value in these cases is the provision of a bedtime meal. This shortens the overnight fasting period and protects against pre-breakfast hypoglycemic attacks.

### COMBINED STIMULATIVE AND FASTING HYPOGLYCEMIA

Organic hyperinsulinism (pancreatic insuloma) combines elements of both types of hypoglycemia (22). Absorption of carbohydrate stimulates excessive utilization of glucose so that hypoglycemic attacks occur 2 to 4 hr. after meals. However, the insuloma, in addition, continues to secrete an excessive amount of insulin in the fasting state. This results in severe pre-breakfast hypoglycemia (Fig. 1). Fasting or restriction of carbohydrate intensifies markedly the degree of hypoglycemia. The secretory activity of the insuloma cannot be sufficiently diminished by low-carbohydrate feeding to prevent the occurrence of hypoglycemia after a short period without food. We are thus in trouble either with or without carbohydrate. This state of affairs, in addition to the fact that organic hyperinsulinism is a relentlessly progressive disease becoming more severe with time, has made any type of dietary management notoriously unsuccessful.

When the diagnosis of organic hyperinsulinism is clear, surgery should be urged. When obliged to manage this condition medically, one is forced to use a diet very high in carbohydrate, with meals spaced sufficiently closely to prevent both postprandial and fasting hypoglycemia. Patients then become obese and make future surgery more hazardous. Even such a program, difficult as it is, will be of but temporary value. Eventually the continuous intravenous administration of glucose may not control the hypoglycemia. Dietary management of organic hyperinsulinism, therefore, cannot be recommended.

### SUMMARY

There are many causes of spontaneous hypoglycemia. Successful dietary management of those which are amenable to medical treatment requires an insight into the mechanism by which the hypoglycemia is produced. Most of the causes can be classified either as stimulative hypoglycemias (those secondary to absorption of carbohydrate) or as fasting hypoglycemias (those resulting from lack of sufficient carbohydrate to satisfy tissue demands).

The stimulative hypoglycemic group, exemplified by functional hyperinsulinism, respond well to high-protein, low-carbohydrate feeding. The basic principles of this regimen are discussed.

The fasting hypoglycemias require diets which are high both in carbohydrate and in protein. A bedtime feeding, designed to shorten the overnight postabsorptive period, is very helpful in combating the pre-breakfast hypoglycemia.

Organic hyperinsulinism (pancreatic insuloma) is, at best, only temporarily responsive to dietary management. Surgery is indicated. Dietary treatment is not recommended.

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## Individualized vs. Standardized Diet Instructions

All too often diet instructions pinch about as badly as do mail order shoes. Patients often cringe at the mention of the word "diet," feeling that they will be asked to follow a distasteful, restrictive regimen. Of necessity the patient's meals while in the hospital conform to a definite pattern; but when Mr. Jones, an ulcer patient who works on a night shift, is ready to be discharged, he is interested in having a practical plan for his particular situation. A careful diet history, including a sample day's menu, times of meals, where eaten, occupation, number of people in the family, where they live, nationality, and religion, is vital if the dietitian is to give satisfactory diet instruction.

A most important consideration is to teach normal nutrition. The therapeutic aspect of the diet is usually just a variation of the normal diet. Since each patient is a distinct personality with his own habits, likes, and dislikes, all of which go to make life more interesting for him, why shouldn't the dietitian make every effort to adapt his diet to suit him? What if he doesn't want citrus fruit for breakfast but likes to eat it for lunch? Or, should the dietitian try to force milk on a Mexican patient if he gets plenty of calcium from the lime water used in making *tortillas*?

The desire for the nod of approval from family and friends is great. One's food habits are usually deep seated and tend to mirror early attitudes. It is, therefore, extremely difficult to achieve many changes, and it is absolutely essential that the patient have an understanding of the benefits to be expected from the diet so that he will feel that the result will be worth the sacrifices he is making. Any suggested change in food habits is of major importance to him. To be of any value, it must be practical. For instance, it is usually futile to expect the mother of a family in financial straits to improve her diet if she is unable also to improve the diet of the whole family, or to expect the occupants of a trailer with a two-burner plate to bake their own salt-free bread.—*Elmira Blecha, dietitian, University of Michigan Hospital, Ann Arbor*, in The Bulletin of the Michigan Dietetic Association, *5: No. 3 (fall), 1946.*

# Further Studies on Nutritional Improvement of Cereal Flours and Cereal Grains with Yeast[1]

**BARNETT SURE**[2]

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EXPERIMENTAL results were recently published on the influence on growth and protein utilization of additions of small amounts of a cultured food yeast to the proteins in enriched refined wheat flour, milled corn meal, and polished rice (1). Since wheat, corn, and rice vary considerably in nitrogen content, and it was the purpose in the earlier study to introduce as high a level as possible of cereal flour or cereal grain in the rations, the latter necessarily varied in the total protein intake. For enriched flour this was 8.74 to 9.07 per cent; for milled corn meal, 7.48 per cent; and for polished rice, 5.79 per cent.

In this study the total protein intake of the diets was equalized by varying the proportion of milled wheat, corn meal, and polished rice in the rations. Rice has the lowest nitrogen content, and by incorporating the maximum amount of this cereal grain (89 per cent), a total of 5.78 per cent protein in the ration was obtained. To maintain the same protein ratio in the milled wheat and corn meal rations, the proportions of these cereal flours were introduced at 57 and 68 per cent, respectively. By such procedure an entirely different picture was obtained as to the relative biological values of the proteins in milled wheat, corn meal, and rice, and also of the relative nutritional benefits obtained with food yeast enrichment. At the reduced levels of milled wheat flour and corn meal, the increased growth and protein utilization following additions of the cultured yeast were much greater.

This investigation also disclosed significant nutritional benefits obtainable by blending 80 per cent extraction flour with small amounts of cultured yeast, Strain *G*, formerly used with enriched 72 per cent extraction flour. These findings are also included in this paper. In addition, this communication contains recent experiences with the use of various primary grown food yeasts in large scale cookery at the University of Arkansas dining halls and cafeterias and at the local Veterans Hospital.

The same enriched wheat flour, milled white corn meal, and polished rice were used as in the previous investigation (1), the total protein content of which were 10.1, 8.5, and 6.5 per cent, respectively. Information has also been included in Tables 1, 4, and 5 on food intake and on increased efficiency in food utilization. The same type of rations and vitamin supplements were used as in the previous study (1). The work was done with albino rats.

From Table 1 it is evident that substitution of 1, 3, and 5 per cent of the enriched flour or milled corn meal with equivalent amounts of yeast, Strain *G*, is accompanied by marked increases in body weight but also with some increases in food consumption. However, the increases in body weight are entirely out of proportion to increases in food intake. For instance, the blending of 54 per cent enriched flour with 3 per cent of the yeast resulted in only 31.3 per cent increased food consumption, as compared to 210.8 per cent increased growth. Calculated in gains in weight per 100 gm. food intake, there was an increase of 127.9 per cent in food utilization. If gains in weight per gram of protein intake are figured, there was 102.8 per cent increase in protein utilization. The results on substitution of 5 per cent of the enriched flour by an equivalent amount of yeast are correspondingly greater; i.e., 218.6 per cent increase in food utilization and 158.3 per cent increase in protein utilization. Work in progress indicates that in the case of one group of six animals, 25 mg. daily additions of the amino acid, lysine,

[1] Research paper No. 819 Journal Series, University of Arkansas. Published with the approval of the director, Arkansas Experiment Station. Aided by a grant from Anheuser-Busch, Inc., St. Louis. Received for publication July 20, 1946.

[2] The author wishes to express his appreciation to Leslie Easterling, Joy Dowell, and Mary Crudup, Department of Agricultural Chemistry, University of Arkansas, for his technical assistance.

during a six-week period accounted for 85 per cent of the growth produced by the additions of 3 per cent of the Strain *G* yeast.

The results of the blending of milled white corn meal with 1, 3, and 5 per cent of the Strain *G* yeast were even more striking. The animals on a diet whose only source of protein was the corn meal were lethargic and had rough fur. Some animals lost weight, and one animal died on the fifth week of experimentation. The study had to be terminated by the end of the sixth week. That these animals were not succumbing because of lack of adequate food intake was apparent, since the substitution of 1 per cent of the corn meal by 1 per cent of the cultured yeast resulted in only 10.6 per cent increased food intake, but in 455.5 per cent increased growth and in 405.6 per cent increase in food utilization. Similarly, the substitution of 3 per cent of this yeast for an equivalent amount of corn meal produced 39.2 per cent increase in food consumption, but 1572.8 per cent increase in growth and 1102.2 per cent increase in food utilization. The increased efficiency in protein utilization was also very marked.

The substitution of polished rice with 1, 3, and 5 per cent of yeast, Strain *G*, produced 19.7, 38.1 and 61.1 per cent increases in body weight, re-

TABLE 1

*Influence on growth and food utilization of additions of small amounts of cultured yeast, Strain* G, *to polished rice, enriched wheat flour, and milled corn meal**

Average results per animal for a six-week period

| TYPE OF RATION** | PER CENT IN RATION | PROTEIN IN RATION | INCREASED PROTEIN IN RATION FROM YEAST | GAIN IN BODY WEIGHT | INCREASE IN BODY WEIGHT | TOTAL FOOD INTAKE | INCREASE IN FOOD INTAKE | GAIN IN WEIGHT PER 100 GM. FOOD INTAKE | INCREASE IN FOOD UTILIZATION | TOTAL PROTEIN INTAKE | PROTEIN UTILIZATION† |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | % | % | *gm.* | % | *gm.* | % | *gm.* | % | *gm.* | *gm.* |
| Polished rice | 89 | 5.79 | — | 52.5 | — | 406 | — | 12.9 | — | 23.5 | 2.23 |
| Polished rice<br>Cultured yeast | 88<br>1 | 6.04 | 4.3 | 62.8 | 19.7 | 439 | 8.1 | 14.3 | 10.9 | 26.5 | 2.37 |
| Polished rice<br>Cultured yeast | 86<br>3 | 6.84 | 18.1 | 72.5 | 38.1 | 441 | 8.6 | 16.4 | 27.1 | 30.1 | 2.41 |
| Polished rice<br>Cultured yeast | 84<br>5 | 7.68 | 32.6 | 84.7 | 61.1 | 452 | 11.3 | 18.7 | 45.0 | 34.7 | 2.44 |
| Enriched flour | 57 | 5.79 | — | 12.0 | — | 288 | — | 4.3 | — | 16.7 | 0.72 |
| Enriched flour<br>Cultured yeast | 56<br>1 | 6.10 | 5.3 | 20.7 | 72.5 | 325 | 12.8 | 6.4 | 48.9 | 19.8 | 1.05 |
| Enriched flour<br>Cultured yeast | 54<br>3 | 6.73 | 16.2 | 37.3 | 210.8 | 379 | 31.3 | 9.8 | 127.9 | 25.5 | 1.46 |
| Enriched flour<br>Cultured yeast | 52<br>5 | 7.36 | 27.1 | 60.7 | 405.8 | 443 | 53.8 | 13.7 | 218.6 | 32.6 | 1.86 |
| Corn meal | 68 | 5.78 | — | 2.2 | — | 247 | — | 0.89 | — | 14.3 | 0.15 |
| Corn meal<br>Cultured yeast | 67<br>1 | 6.11 | 5.7 | 12.2 | 455.5 | 273 | 10.6 | 4.5 | 405.6 | 16.7 | 0.73 |
| Corn meal<br>Cultured yeast | 65<br>3 | 6.78 | 17.3 | 36.8 | 1572.8 | 344 | 39.2 | 10.7 | 1102.2 | 23.3 | 1.58 |
| Corn meal<br>Cultured yeast | 63<br>5 | 7.44 | 28.7 | 61.7 | 2704.5 | 393 | 59.1 | 15.7 | 1664.0 | 29.3 | 2.11 |

* Six ♂'s and six ♀'s in each experiment.

** The ration was supplemented daily with a B-complex mixture of the following composition: 100 mcg. thiamine, 100 mcg. riboflavin, 100 mcg. pyridoxine, 600 mcg. calcium pantothenate, 100 mcg. nicotinic acid, 12 mg. choline chloride, 12 mg. para-aminobenzoic acid, and 3 mg. inositol.

† Gain in weight per gram of protein intake.

spectively. However, there were relatively small increases in food utilization and insignificant increases in protein utilization. The reason cultured yeast, Strain *G*, proved of lesser nutritional benefit for enrichment of the proteins in polished rice is because the proteins in polished rice are much superior to those in milled wheat and in milled corn meal. On the same protein level, the proteins in polished rice are three times as efficient as those in enriched wheat flour (Table 1), the figures for polished rice being 2.23 gm. gain in weight per gram of protein intake and for enriched wheat flour, 0.72 gm.

In order to obtain further information on the relative biological values of the proteins in these cereal grains, two sets of experiments were carried out, twenty-four animals in each set. The total protein in the ration was 5.78 per cent, provided respectively by 89 per cent polished rice and 68 per cent corn meal. In each set the animals receiving enriched wheat flour were limited to the amount of food consumed by the animals receiving polished rice.

The experimental period of Set *1* was forty-six days and the composition of the B-complex was as follows: 100 mcg. thiamine, 100 mcg. riboflavin, 100 mcg. pyridoxine, 600 mcg. calcium pantothenate, 12 mg. choline chloride, 12 mg. para-aminobenzoic acid, and 3 mg. inositol. The average gain in weight per animal on the proteins in polished rice was 35.2 gm. and on the enriched wheat flour, 14.6 gm. The gain in weight per gram of protein intake for the polished rice was 1.73 gm. and for the enriched flour was 0.61 gm.

The experimental period of Set *2* was seventy-six days, and the composition of the B-complex was as follows: 20 mcg. thiamine, 20 mcg. riboflavin, 20 mcg. pyridoxine, 200 mcg. calcium pantothenate, and 6 mg. choline chloride. The average gain in weight per animal on the proteins in polished rice was 53.3 gm. and on the wheat flour, 26.2 gm. The gain in weight per gram of protein intake on the polished rice was 1.60 gm. and on the wheat flour, 0.83 gm. In other words, on the same protein level and on the same amount of food intake, the proteins in polished rice proved much superior to the proteins in enriched milled wheat flour (Fig. 1). The increased efficiency in protein utilization in favor of the polished rice versus wheat flour proved to be 143.6 per cent in Set *1*, and 104.8 per set in Set *2* experiments. From Tables 2 and 3 it is evident that no noteworthy differences were found in the moisture, fat, protein, and ash contents of the rice- and wheat-fed animals at the termination of the experiments when they were sacrificed and analyzed according to the technique previously described (2).

From Tables 4 and 5 it is evident that marked nutritional benefits were obtained by blending 80 per cent extraction flour with small amounts of cultured food yeast, Strain *G*. During a six-week period, on a total protein intake in the ration of 5.78 per cent, the following results were obtained: The substitution of 1 and 3 per cent flour by equal amounts of strain *G* yeast resulted respectively in 97.2 and 278.5 per cent increased growth; in 70.2 and 174.5 per cent increased food utilization; and 59.8 and 132.9 per cent increased protein utilization.

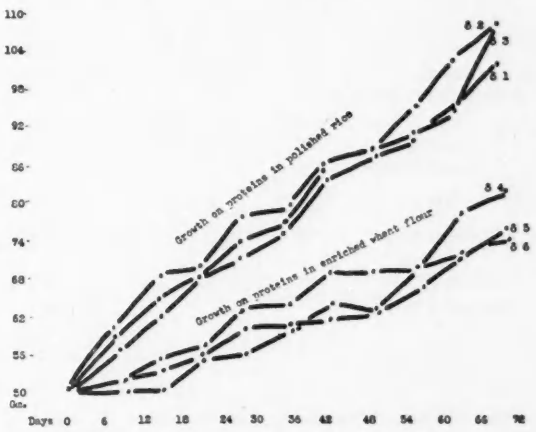


FIG. 1. *Relative growths of albino rats on proteins in polished rice and enriched refined wheat flour. All animals received the same amounts of food and the same 5.78 per cent protein level in rations. Ration was supplemented daily with a B-complex mixture of the following composition: 100 mcg. thiamine, 100 mcg. riboflavin, 600 mcg. calcium pantothenate, 100 mcg. nicotinic acid, 12 mg. choline chloride, 12 mg. para-aminobenzoic acid, and 3 mg. inositol.*

During a ten-week period, on the same level of protein intake, the substitution of the 80 per cent extraction flour with the same amounts of yeast, was followed by 130.2 and 367.6 per cent increases in body weight, by 85.4 and 214.6 per cent increases in food utilization, and by 78.5 and 160.0 per cent increases in protein utilization. Even on the 9.03 per cent protein intake, the blending of 80 per cent extraction flour with small amounts of this yeast resulted in significant increases in growth but in less increased efficiency in food utilization (Table 5). On a 5.78 per cent protein intake, there was no noteworthy difference in biological values of the proteins in 80 per cent or the highly milled wheat flour. However, on a 9 per cent protein intake, the gain in weight per gram of protein intake for the proteins in 80 per cent extraction flour was 1.25 gm. compared with 0.70 gm., as indicated in this study, and 0.78–0.88 gm. for enriched highly milled wheat flour, as found in a previous investigation (1). Nevertheless, the proteins of 80 per cent extraction flour are of a low biological value, as indicated by the marked responses obtained following the additions of small amounts of cultured

TABLE 2

*Influence of small additions of cultured yeast, Strain* G, *to the proteins in polished rice, enriched wheat flour, and milled corn meal on the chemical composition of the albino rat**

| TYPE OF RATION | PER CENT IN RATION | TOTAL BODY WEIGHT OF TWELVE ANIMALS | CHEMICAL COMPOSITION OF ANIMALS | | | | |
|---|---|---|---|---|---|---|---|
| | | | Moisture | Protein | Fat | Ash | Total |
| | | *gm.* | % | % | % | % | % |
| Polished rice | 89 | 990 | 58.0 | 17.1 | 19.4 | 4.0 | 98.5 |
| Polished rice<br>Cultured yeast | 86<br>3 | 1052 | 57.0 | 17.1 | 20.9 | 3.9 | 98.9 |
| Polished rice<br>Cultured yeast | 84<br>5 | 1606 | 58.8 | 18.7 | 16.8 | 3.4 | 97.7 |
| Enriched flour | 57 | 714 | 61.5 | 17.7 | 14.7 | 4.1 | 98.0 |
| Enriched flour<br>Cultured yeast | 54<br>3 | 1094 | 62.4 | 16.4 | 15.5 | 3.4 | 97.4 |
| Enriched flour<br>Cultured yeast | 52<br>5 | 1234 | 55.0 | 18.1 | 21.1 | 3.7 | 97.9 |
| Corn meal | 68 | 532 | 56.6 | 18.0 | 20.1 | 4.6 | 99.3 |
| Corn meal<br>Cultured yeast | 65<br>3 | 1006 | 53.4 | 17.8 | 24.7 | 4.0 | 99.9 |
| Corn meal<br>Cultured yeast | 63<br>5 | 1298 | 57.0 | 17.6 | 20.3 | 3.6 | 98.5 |

* Average results per animal for a six-week period.

TABLE 3

*Chemical composition of albino rats on proteins in rice versus proteins in enriched wheat flour**

| TYPE OF RATION | PER CENT IN RATION | TOTAL BODY WEIGHT OF TWELVE ANIMALS | CHEMICAL COMPOSITION OF ANIMALS | | | | |
|---|---|---|---|---|---|---|---|
| | | | Moisture | Protein | Fat | Ash | Total |
| | | *gm.* | % | % | % | % | % |
| Polished rice** | 89 | 1382 | 54.9 | 17.3 | 22.5 | 3.4 | 98.1 |
| Enriched flour** | 57 | 1347 | 58.1 | 17.0 | 18.7 | 4.2 | 98.0 |
| Polished rice† | 89 | 990 | 55.8 | 16.8 | 22.7 | 3.6 | 98.5 |
| Enriched flour† | 57 | 730 | 55.9 | 16.9 | 20.5 | 3.9 | 97.1 |

* Six ♂'s and six ♀'s in each experiment. Average results per animal for a ten-week period.

** *Ad libitum* feeding.

† Controlled feeding.

food yeast used as a source of amino acid supplementation.

From Tables 4 and 5 it would appear that the biological value of the protein of rolled oats is approximately equal to that in polished rice. It was necessary, however, to add at least 5 per cent of the Strain *G* yeast to obtain appreciable benefits.

## ACCEPTABILITY OF PRIMARY GROWN FOOD YEASTS IN LARGE SCALE COOKERY

Before primary grown cultured food yeasts can be generally accepted for use in everyday cooking, the housewife and dietitian need more information on whether foods baked or cooked with such yeast supplements have any undesirable odors or flavors. An opportunity was afforded for such acceptability tests to be conducted at the various dining halls and cafeterias at the University of Arkansas and the Veterans Hospital in Fayetteville, Arkansas.

The following university dining halls cooperated in these experiments: Davis Hall, Carnall Hall, Student Union, Camp Neil Martin Cafeteria, Razorback Hall, and the Nursery School. Various yeasts were added to a number of foods, including a mixture of Strain *G* and *300*, Strain *300*, Strain *G*, Strain *90*, and Strain *200*. A list of the foods to which the yeasts were added follows:

Beef hash
Beef stew
Chicken pie
Chocolate cake
Chocolate crunch cookies
Chocolate pudding
Corn bread
Corn muffins
Creamed chipped beef on toast
Custards
Escalloped potatoes
Fish flake salad
Hamburgers
Hot biscuits
Macaroni and cheese
Meat loaf
Meat salad sandwiches
Peanut butter
Pimento cheese sandwiches
Rolls
Salmon croquettes
Spaghetti
Spanish rice
Spice cake
Spiced bread pudding
Sponge cake
Tomato juice
Whole wheat rolls

Reports from the dining hall directors at the University show that the palatability of all the foods considered was not decreased by the addition of the yeast, even when the percentage was as high as 3 per cent, and all foods were well accepted.

It is particularly interesting that the eighteen children, ranging in age from two to five years, who ate the yeast-supplemented food at the University Nursery School, manifested an unusual amount of activity during the time that the experimental foods were served. One especially successful food tried at the Nursery School was a peanut butter spread made with 2 tbsp. peanut butter, slightly warmed; 2 tsp. food yeast, Strain *300*; and 2 tsp. melted butter. After warming and thoroughly mixing, the spread was served on warm toast or hot breads. This mixture constituted a 20 per cent yeast mix in the peanut butter and served as an abundant source of B-complex as well as a protein concentrate, since the peanut butter contains 26.1 per cent protein and the yeast about 50 per cent protein.

At the Veterans Hospital, Strain *300* yeast was added to rice pancakes, brownies, bran muffins,

TABLE 4

*Influence on growth and food utilization of additions of small amounts of cultured yeast, Strain G, to 80 per cent extraction flour and rolled oats**

Average results per animal for a six-week period

| TYPE OF RATION** | PER CENT IN RATION | PROTEIN IN RATION | INCREASED PROTEIN IN RATION FROM YEAST | GAIN IN BODY WEIGHT | INCREASE IN BODY WEIGHT | TOTAL FOOD INTAKE | INCREASE IN FOOD INTAKE | GAIN IN WEIGHT PER 100 GM. FOOD INTAKE | INCREASE IN FOOD UTILIZATION | TOTAL PROTEIN INTAKE | PROTEIN UTILIZATION | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Gain in weight per gram of protein intake | Increase |
| | | % | % | *gm.* | % | *gm.* | % | *gm.* | % | *gm.* | *gm.* | % |
| 80 per cent extraction flour | 57.2 | 5.78 | — | 14.3 | — | 302 | — | 4.7 | — | 17.5 | 0.82 | — |
| 80 per cent extraction flour<br>Cultured yeast | 56.2<br>1.0 | 6.09 | 5.4 | 28.2 | 97.2 | 352 | 16.5 | 8.0 | 70.2 | 21.4 | 1.31 | 59.8 |
| 80 per cent extraction flour<br>Cultured yeast | 54.2<br>3.0 | 6.73 | 16.4 | 54.2 | 278.5 | 422 | 39.7 | 12.9 | 174.5 | 28.4 | 1.97 | 132.9 |
| Rolled oats | 38 | 5.78 | — | 46.2 | — | 387 | — | 11.9 | — | 22.4 | 2.06 | — |
| Rolled oats<br>Cultured yeast | 37<br>1 | 6.13 | 6.0 | 60.9 | 31.8 | 433 | 11.9 | 14.1 | 18.5 | 26.5 | 2.30 | 11.6 |
| Rolled oats<br>Cultured yeast | 35<br>3 | 6.57 | 13.7 | 71.2 | 54.1 | 436 | 12.5 | 16.3 | 37.0 | 28.6 | 2.49 | 20.9 |

* Six ♂'s and six ♀'s in each experiment.

** The ration was supplemented daily with a B-complex mixture of the following composition: 100 mcg. thiamine, 100 mcg. riboflavin, 100 mcg. pyridoxine, 600 mcg. calcium pantothenate, 100 mcg. nicotinic acid, 12 mg. choline chloride, 12 mg. para-aminobenzoic acid, and 3 mg. inositol.

sandwich buns, biscuits made with 25 per cent soy flour, Spanish rice without meat, chicken cream soup, weiner buns, and tomato soup with beef stock and noodles.

Julia Lingenfelder, chief dietitian, reported that detectability varied with the food and the percentage of yeast. She stated: "The least taste seemed to be imparted to bread products. One to 2 per cent of yeast per weight of flour was not detectable. Three per cent made it slightly noticeable in white flour buns, but not in pancakes when a small amount of vanilla was added. A small batch of corn bread, using 6 per cent yeast, bacon drippings for shortening, and sorghum molasses for sweetening, was tried. Due to the darkened color it may not have been generally acceptable but those who ate of it declared it to be delicious.

"The yeast in varying amounts up to 5 per cent was also tried in cooked cereals. The yeast imparted a characteristic flavor in all amounts. If sugar and cream were used, the cereal was not unpalatable. The additions of raisins stewed with the cereal also helped.

"Yeast was found to be satisfactory in soups where starchy foods, such as noodles, rice, and spaghetti, were used to keep the yeast in suspension, as it settled out easily. A concentration of up to 1 per cent imparted a distinctive flavor but was well accepted. The same was true of gravies. Yeast had a tendency to thicken any product in which it was used.

"The use of yeast in chocolate sirup to be used for beverage was disappointing. Concentrations of yeast up to 2.5 per cent yeast were tried. The flavor was difficult to mask although not as objectionable in hot as in cold mixes. Since the yeast settled out when milk was added, even when boiled with the sirup preparation, the full value of the yeast was not readily obtained. The sirup was made in the proportion of: ½ cup cocoa; ½ cup yeast; dash of salt; sugar to sweeten. Water was added and boiled to make 1 cup sirup. Two to 4 tsp. of this mix was used in a glass of milk. Vanilla or peppermint was used to flavor each portion."

As can be seen from the above reports considerably more work needs to be done with such yeasts in beverages. Several students have found that 1 tsp. of the dried primary grown yeasts can be used in a glassful of tomato juice or grapefruit juice without detecting any objectionable tastes.

It is evident then from the experiences in large scale cookery at University of Arkansas and from the experiences of the chief dietitian of the Veterans Hospital at Fayetteville that primary grown cultured

TABLE 5

*Influence on growth and food utilization of additions of small amounts of cultured yeast, Strain G, to 80 per cent extraction flour and rolled oats**

Average results per animal for a ten-week period

| TYPE OF RATION** | PER CENT IN RATION | PROTEIN IN RATION | INCREASED PROTEIN IN RATION FROM YEAST | GAIN IN BODY WEIGHT | INCREASE IN BODY WEIGHT | TOTAL FOOD INTAKE | INCREASE IN FOOD INTAKE | GAIN IN WEIGHT PER 100 GM. FOOD INTAKE | INCREASE IN FOOD UTILIZATION | TOTAL PROTEIN INTAKE | PROTEIN UTILIZATION | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Gain in weight per gram of protein intake | Increase |
| | | % | % | *gm.* | % | *gm.* | % | *gm.* | % | *gm.* | *gm.* | % |
| 80 per cent extraction flour | 57.2 | 5.78 | — | 18.2 | — | 449 | — | 4.1 | — | 26.0 | 0.70 | — |
| 80 per cent extraction flour | 56.2 | 6.09 | 5.4 | 41.9 | 130.2 | 548 | 22.0 | 7.6 | 85.4 | 33.4 | 1.25 | 78.5 |
| Cultured yeast | 1.0 | | | | | | | | | | | |
| 80 per cent extraction flour | 54.2 | 6.73 | 16.4 | 85.1 | 367.6 | 699 | 55.7 | 12.9 | 214.6 | 47.0 | 1.82 | 160.0 |
| Cultured yeast | 3.0 | | | | | | | | | | | |
| 80 per cent extraction flour | 89 | 9.03 | — | 61.1 | — | 543 | — | 11.2 | — | 49.0 | 1.25 | — |
| 80 per cent extraction flour | 88 | 9.35 | 3.5 | 88.1 | 44.2 | 650 | 19.8 | 13.6 | 19.1 | 60.8 | 1.45 | 16.0 |
| Cultured yeast | 1 | | | | | | | | | | | |
| 80 per cent extraction flour | 86 | 9.98 | 10.5 | 134.0 | 119.3 | 768 | 41.6 | 17.4 | 55.3 | 76.6 | 1.75 | 40.0 |
| Cultured yeast | 3 | | | | | | | | | | | |
| Rolled oats | 38 | 5.78 | — | 82.7 | — | 703 | — | 11.7 | — | 40.6 | 2.03 | — |
| Rolled oats | 37 | 6.13 | 6.0 | 101.0 | 22.1 | 781 | 10.2 | 12.9 | 10.2 | 47.8 | 2.11 | 3.8 |
| Cultured yeast | 1 | | | | | | | | | | | |
| Rolled oats | 35 | 6.57 | 13.7 | 116.6 | 41.0 | 803 | 13.1 | 14.5 | 24.0 | 52.8 | 2.21 | 8.1 |
| Cultured yeast | 3 | | | | | | | | | | | |
| Rolled oats | 33 | 7.10 | 22.8 | 149.2 | 80.4 | 858 | 22.0 | 17.4 | 48.7 | 60.9 | 2.45 | 20.7 |
| Cultured yeast | 5 | | | | | | | | | | | |

* Six ♂'s and six ♀'s in each experiment.

** The ration was supplemented daily with a B-complex mixture of the following composition: 100 mcg. thiamine, 100 mcg. riboflavin, 100 mcg. pyridoxine, 600 mcg. calcium pantothenate, 100 mcg. nicotinic acid, 12 mg. choline chloride, 12 mg. paraaminobenzoic acid, and 3 mg. inositol.

food yeasts to the extent of 2 to 3 per cent may be readily introduced without any apprehension of yeast tastiness in the foods listed. In peanut butter as much as 20 per cent of such yeasts was added without detection of undesirable taste. By using small amounts of these yeasts (dried brewers' or primary grown cultured yeasts) a highly concentrated food, abundant in unknown as well as all known components of the B-complex and which serves in addition as an amino acid supplement to the proteins of the cereal grains was available.

## SUMMARY

Further evidence has been presented on the marked nutritional benefits obtained by the additions of small amounts of a cultured food yeast (Strain *G*) to the proteins of enriched refined wheat flour, to 80 per cent extraction flour, and to milled white corn meal. Data are also presented on the influence of additions of small amounts of this yeast to the proteins in polished rice and rolled oats.

The proteins in polished rice were found to be three times as efficient biologically as those in enriched white flour, when fed on the same level of protein intake. For the same amount of food as well as for the same protein level of intake, the proteins of polished rice are still much superior to those of enriched wheat flour.

Various primary grown cultured food yeasts have been used in large scale cookery at the University of Arkansas and at the Veterans Hospital at Fayetteville to the extent of 1 to 3 per cent and were found to be acceptable in such foods as hot biscuits, rolls, burgers, chicken pie, macaroni and cheese and

spaghetti and cheese dishes, Spanish rice, soups, gravies, cookies, chocolate cake, sponge cake, chocolate pudding, custards, and pimiento cheese sandwiches. In peanut butter as much as 20 per cent of such yeasts was introduced without detection of any yeast tastiness.

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### *Body Utilization of Iron*

New light on the process of iron utilization in the body has been disclosed by results of fundamental research carried on by Dr. Leonor Michaelis and Dr. S. Granick, Rockefeller Institute for Medical Research. Other discoveries in the same field have recently been reported by Drs. A. L. Schade and L. Caroline at the Overly Biochemical Research Foundation, New York City; the group headed by Professor Edwin J. Cohn at Harvard Medical School; and the Western Regional Research Laboratory of the U. S. Department of Agriculture at Albany, California.

A new type of protein named "apoferritin" which differs from all other proteins of the body and is slightly different in each kind of animal has been discovered at the Rockefeller Institute. It has been found in most mammals, including man. Studies indicate that it is created only in accordance with the needs of the body to store any iron in the circulation. Apoferritin has not been found in the pure state in the body but always in combination with iron. From a brown crystalline protein (ferritin), ferric hydroxide can be extracted, and the iron-free clear crystal residue is apoferritin.

By using a radioactive iron salt, the iron has been shown to be stored rapidly in the liver and in some instances, also in the spleen, in the form of ferritin. The apoferritin not only stores iron taken in through food, but also saves iron resulting from the breaking down of red blood cells. Experiments seem to show that apoferritin is "synthesized just to such an extent as is necessary for the storage of the iron," according to Dr. Michaelis.

It has previously been shown that globulins in the blood serum combine with iron and hold it in a form which the body cannot utilize. Drs. Schade and Caroline have shown that the iron combines with one particular fraction of the serum globulins, identified by Dr. Cohn and co-workers, as one of the beta globulins. They have also found that the raw egg white also contains a specific component which likewise has the power to combine with iron and make it unavailable. This egg white component was found by Dr. Michaelis to be entirely different from ferritin or apoferritin. In globulin, ferritin, and egg white, the iron is in a ferric form, but in hemoglobin, it is ferrous.

The data obtained in these studies have shown a new picture of the way the body absorbs, transports, and stores iron, which is as follows:

Iron enters the gastrointestinal tract in the ferric state with food. There part of it is converted to the ferrous state for absorption into the circulation, while the remainder is stored as ferritin. The ferrous part, which enters the circulation, becomes attached to the beta globulin fraction of the blood serum and somehow is converted into the ferric form. The beta globulin, in turn, passes the iron on to the liver, spleen, and bone marrow where part of it is converted for current use into the ferrous form, while the remainder is stored in the ferric form as ferritin.

The ferrous iron in the intestinal mucosa cells is presumed to be in equilibrium with the ferric iron in the mucosal ferritin as well as with the ferric iron carried by the beta globulin in the blood plasma. As the mucosa is depleted of ferrous iron, it is replenished from ferritin. This process involves the reduction of ferric to ferrous iron. Only when the ferritin has been exhausted as a source of mucosal iron will iron from the food be absorbed and take its place. Thus the iron content of the blood is kept on a rather constant low level.

Furthermore, the ferric iron of the beta globulin in the blood plasma is also in equilibrium and exchanges rapidly with the ferrous iron and ferritin of the liver, spleen, and bone marrow, where also the ferritin and ferrous iron are in equilibrium. It is suggested that only ferrous iron is capable of transfer from the cells to the blood stream.

In the bone marrow, not only is ferrous iron converted to ferritin for storage, but ferrous iron is also incorporated into protoporphyrin to form hemin, which in turn is attached to globin to form hemoglobin. The iron released from the breakdown of hemoglobin is carefully conserved by the apoferritin for re-use.—*New York Times, December 15, 1946.*

# Palatability and Ascorbic Acid Retention of Rutabaga, Peas, and Cabbage after Holding on the Steam Table[1]

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ASCORBIC acid losses in vegetables prepared by institutional methods due to cooking and subsequent steam table holding have been found to range between 17 and 91 per cent by Nagel and Harris (1), Daum, Aimone, and Hollister (2), and Heller, McCay, and Lyon (3). While large variations in the rate and magnitude of ascorbic acid losses are evident, preparation factors which might be responsible for these variations have not been described or demonstrated. Recently Jones, *et al.* (4), Kahn *et al.* (5), and Wood, *et al.* (6) reported more detailed studies showing effects of various institutional cooking procedures on the ascorbic acid content of frozen broccoli, potatoes, and other vegetables.

The character of large quantity food service demands provision for temporary high temperature storage of cooked vegetables usually accomplished by placing the vegetables on a steam table. The Southern Cooperative Group of Agricultural Experiment Stations studying the Conservation of the Nutritive Value of Foods (7) reported that average losses of ascorbic acid were not excessive during 30 min. on the steam table. However, there were large variations in data from different kitchens and preparation methods were not controlled. Commonly occurring variations in routine institutional procedures which might effect steam table holding results reported in previous studies include: (1) method of holding vegetable, (2) length of time vegetables were held, and (3) temperature of the steam table. Replication of cooking and holding trials sufficient to allow evaluation of the wide variation in vitamin concentration of successive vegetable samples are necessary in order to interpret the results of any given experiment.

The purpose of this study is to show the effects of various steam table holding practices on the ascorbic acid content and palatability of rutabagas, fresh green peas, and cabbage. To make comparisons of data more practicable, preparation and sampling procedures have been controlled. Total ascorbic acid was determined. Since the emphasis in this study has been in the development of procedures which will result in a portion of vegetable carrying a maximum of vitamin as it is served to the consumer, ascorbic acid values are reported as milligrams per 100 gm. of moist vegetable, and no attempt has been made to express ascorbic acid differences in raw and cooked vegetable samples as percentage losses.

Porter, *et al.* (8) have shown that 100 gm. of raw vegetables do not yield the same total solids as 100 gm. of cooked vegetable and that an error is introduced into the expression of vitamin concentration proportional to the difference in solids. Although this error is minimized by analysis of the cooking liquid, it is not avoided, and the volumes of material involved, cooking practices, and difficulties in sampling frequently make impractical the examination of the cooking water in institutional studies.

## EXPERIMENTAL PROCEDURES

Rutabaga, cabbage, and green peas were purchased through a local market and held in the laboratory under refrigeration for about 12 hr. before preparation. The vegetables chosen varied in size, texture, and preparation requirements. Since breaking of cell walls probably increases ascorbic acid losses, samples of certain vegetables were left intact or cut into relatively large pieces in preparation for holding while some were cut into small pieces or mashed. Other holding variants were the

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[2] The authors wish to express their appreciation to Dr. W. D. Baten, associate professor of mathematics and research associate in statistics, Michigan State College, for his assistance with the statistical analysis of the data for this study.

use of butter as seasoning and the amount of cooking liquid on vegetables during steam table storage. Ten- to 15-lb. lots of each vegetable were cleaned and prepared for analysis as outlined in Table 1.

Each vegetable was prepared eighteen times (Table 1). Nine complete replications of prepared vegetable were held for an hour at 90° ± 1°C., and nine at 100° ± 1°C. Samples for analysis were taken after 0, 15, 30, and 60 min. of holding. Vegetables were held on the steam table in covered 1-qt. enamel pans. The water bath was filled so that steam pipes were covered and the bottom of the pan containing the vegetable was about 1 in. above the water surface. Corrections were made for dilution in those tests in which butter was added to the cooked vegetable.

In making ascorbic acid determinations, vegetable samples were weighed as soon as taken, covered with 5 per cent metaphosphoric acid in the ratio of one part of vegetable to five parts of acid, and total ascorbic acid was determined immediately by the method of Roe, *et al.* (9).

Cooked vegetables were scored for palatability by six judges using a five-point rating scale similar to the scale described by Porter, *et al.* (10).

Statistical analysis of data was done as follows: Ascorbic acid concentrations for each variation in preparation and steam table storage were submitted to analysis of variance (11). The influence of method of preparation, temperature of the steam table, time of steam table holding, and the variation between samples of vegetable were tested. Standard deviations were calculated for the eighteen raw and cooked samples and for each group of nine values for holding time.

## RESULTS AND DISCUSSION

Ascorbic acid concentrations of raw and corresponding freshly cooked vegetables are shown in Table 2. Reductions in the amount of vitamin in the serving portion of moist vegetable as a result of controlled cooking procedures were 33 per cent in rutabaga, 35 per cent in peas, 46 per cent in 3-in. cabbage wedges, and 55 per cent in 1-in. cabbage wedges. These data are in accord with previously reported studies (6, 7, 12). Standard deviations of from 3.6 for eighteen samples of uncooked rutabaga

TABLE 2

*Total ascorbic acid in raw and freshly cooked portions of vegetables*

| VEGETABLE | NUMBER OF REPLICATIONS | ASCORBIC ACID* | | DIFFERENCE IN COOKED PORTION |
|---|---|---|---|---|
| | | Raw | Cooked | |
| | | *mg./100 gm.* | *mg./100 gm.* | % |
| Rutabaga | 18 | 30.2 ±3.60 | 20.1 ±2.00 | 33 |
| Peas | 18 | 22.6 ±4.90 | 14.8 ±2.24 | 35 |
| Cabbage (3-in. wedges) | 18 | 50.2 ±6.63 | 27.0 ±5.83 | 46 |
| Cabbage (1-in. wedges) | 18 | 50.2 ±6.63 | 23.4 ±3.32 | 55 |

* The estimate of variation is the standard deviation of the items.

TABLE 1

*Preparation procedures for cooking and steam table holding methods*

| VEGETABLE* | COOKING PROCEDURE | STEAM TABLE HOLDING METHODS | | |
|---|---|---|---|---|
| | | I | II | III |
| Purple top rutabaga** cut into 1-in. cubes | 3600 gm. steamed 23 min. in 400 cc. water at 5-lb. pressure | 900 gm. held as drained, 1-in. cubes | 900 gm.†† held as mashed vegetable | 900 gm.†† mashed, seasoned with 60 gm. butter |
| Giant green peas shelled† | 2000 gm. added to 2000 gm. of rapidly boiling water and cooked uncovered 15 min. | 600 gm. held as cooked, drained peas | 400 gm. peas covered with 300 gm. cooking liquid | 600 gm. of drained peas, seasoned with 50 gm. butter |
| Winter cabbage** cut into 3-in. wedges | 2000 gm. added to 5000 gm. of rapidly boiling water and cooked uncovered 15 min. | 600 gm. held as cooked, drained vegetable | | |
| Winter cabbage** cut into 1-in. wedges | 2000 gm. added to 5000 gm. of rapidly boiling water and cooked uncovered 15 min. | | 600 gm. held as cooked, drained vegetable | 600 gm. of cooked, drained vegetable seasoned with 30 gm. butter |

* 18 replications of each cooking test were made—9 held on steam table at 90° ± 1° C. and 9 at 100° ± 1° C. Samples for analysis were taken before cooking and at 0, 15, 30, and 60 min. of steam table holding.

** ¼-in. longitudinal wedges were cut from opposite sides of each cleaned vegetable in cooking lot for raw value determinations. Alternate quarters of each cabbage were cut into 1- and 3-in. wedges for cooking.

† Shelled peas were sampled at random for raw value determinations.

†† 2000 gm. were mashed in the 10-qt. bowl of a table Hobart mixer.

TABLE 3

*Total ascorbic acid and palatability of cooked rutabaga*

| HOLDING TIME | NUMBER OF REPLICATIONS | CUBED, DRAINED | | | DRAINED, MASHED | | | DRAINED, MASHED, BUTTER ADDED | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Ascorbic acid | Decrease from 0 min. | Palatability score* | Ascorbic acid | Decrease from 0 min. | Palatability score | Ascorbic acid | Decrease from 0 min. | Palatability score* |
| Held on steam table at 90°C. | | | | | | | | | | |
| *min.* | | *mg. per 100 gm.*** | % | | *mg. per 100 gm.*** | % | | *mg. per 100 gm.*** | % | |
| 0 | 9 | 21.6 ± 1.22 | 0.0 | 3.6 | 21.5 ± 1.33 | 0.0 | 3.3 | 21.1 ± 1.26 | 0.0 | 3.6 |
| 15 | 9 | 21.4 ± 1.67 | 0.9 | 3.5 | 21.4 ± 1.23 | 0.5 | 3.1 | 20.6 ± 1.80 | 2.4 | 3.5 |
| 30 | 9 | 18.6 ± 1.58 | 13.9 | 3.2 | 19.4 ± 2.19 | 9.8 | 2.8 | 18.7 ± 1.92 | 11.4 | 3.3 |
| 60 | 9 | 15.4 ± 3.05 | 28.7 | 2.7 | 16.4 ± 1.81 | 23.7 | 2.5 | 16.0 ± 1.58 | 24.2 | 2.8 |
| Held on steam table at 100°C. | | | | | | | | | | |
| 0 | 9 | 18.6 ± 1.32 | 0.0 | 2.8 | 19.2 ± 1.09 | 0.0 | 2.5 | 19.5 ± 1.42 | 0.0 | 3.1 |
| 15 | 9 | 18.7 ± 1.92 | 0.5 | 2.8 | 19.0 ± 2.23 | 1.0 | 2.6 | 17.9 ± 2.23 | 8.2 | 2.7 |
| 30 | 9 | 15.7 ± 1.62 | 15.6 | 2.3 | 15.6 ± 1.50 | 18.8 | 1.9 | 14.9 ± 1.96 | 23.6 | 2.4 |
| 60 | 9 | 11.4 ± 1.67 | 38.7 | 2.2 | 11.1 ± 1.83 | 42.2 | 1.7 | 10.0 ± 2.00 | 48.7 | 2.0 |

* Five-point rating scale used; maximum eating quality of palatability would score 5.
** The estimate of variation is the standard deviation of the items.

TABLE 4

*Total ascorbic acid and palatability of cooked peas*

| HOLDING TIME | NUMBER OF REPLICATIONS | DRAINED | | | HELD IN COOKING LIQUID | | | DRAINED, BUTTER ADDED | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Ascorbic acid | Decrease from 0 min. | Palatability score* | Ascorbic acid | Decrease from 0 min. | Palatability score* | Ascorbic acid | Decrease from 0 min. | Palatability score* |
| Held on steam table at 90°C. | | | | | | | | | | |
| *min.* | | *mg. per 100 gm.*** | % | | *mg. per 100 gm.*** | % | | *mg. per 100 gm.*** | % | |
| 0 | 9 | 16.1 ± 2.23 | 0 | 4.5 | 15.5 ± 2.50 | 0 | 4.5 | 17.0 ± 3.08 | 0 | 4.2 |
| 30 | 9 | 13.1 ± 1.29 | 18.6 | 3.6 | 14.1 ± 2.37 | 9.0 | 4.0 | 13.4 ± 1.67 | 21.2 | 3.7 |
| 60 | 9 | 10.1 ± 1.49 | 37.9 | 3.3 | 12.7 ± 2.99 | 18.1 | 3.9 | 11.0 ± 2.00 | 35.3 | 3.4 |
| Held on steam table at 100°C.** | | | | | | | | | | |
| 0 | 9 | 13.6 ± 1.50 | 0 | | 13.1 ± 1.36 | 0 | | 14.5 ± 1.77 | 0 | |
| 30 | 9 | 11.1 ± 1.20 | 18.4 | | 10.6 ± 1.66 | 19.1 | | 12.0 ± 1.32 | 17.2 | |
| 60 | 9 | 9.0 ± 0.87 | 33.8 | | 10.3 ± 1.05 | 21.4 | | 9.4 ± 1.12 | 35.2 | |

* Palatability scores were not obtained on peas held on the steam table at 100°C.
** The estimate of variation is the standard deviation of the items.

TABLE 5

*Total ascorbic acid and palatability of cooked cabbage*

| HOLDING TIME | NUMBER OF REPLICATIONS | 3-IN. WEDGES, BOILED, DRAINED | | | 1-IN. WEDGES BOILED, DRAINED | | | 1-IN. WEDGES, DRAINED, BUTTERED | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Ascorbic acid | Decrease from 0 min. | Palatability score | Ascorbic acid | Decrease from 0 min. | Palatability score | Ascorbic acid | Decrease from 0 min. | Palatability score |
| Held on steam table at 90°C. | | | | | | | | | | |
| *min.* | | *mg. per 100 gm.** | % | | *mg. per 100 gm.** | % | | *mg. per 100 gm.** | % | |
| 0 | 9 | 29.7 ± 7.09 | 0 | 3.8 | 24.2 ± 4.32 | 0 | 3.9 | 25.3 ± 4.12 | 0 | 3.8 |
| 15 | 9 | 29.0 ± 6.30 | 2.4 | 3.9 | 24.6 ± 5.05 | 1.7 | 3.5 | | | |
| 30 | 9 | 28.0 ± 6.76 | 5.7 | 3.1 | 22.0 ± 4.44 | 9.1 | 3.1 | | | |
| 60 | 9 | 27.4 ± 8.20 | 7.7 | 2.8 | 21.3 ± 4.81 | 12.0 | 2.7 | 22.4 ± 5.03 | 11.5 | 2.5 |
| Held on steam table at 100°C. | | | | | | | | | | |
| 0 | 9 | 24.4 ± 4.28 | 0 | 4.3 | 22.6 ± 4.16 | 0 | 4.2 | 24.0 ± 3.78 | 0 | 3.9 |
| 15 | 9 | 23.4 ± 4.98 | 4.1 | 3.8 | 21.0 ± 3.97 | 7.1 | 3.7 | | | |
| 30 | 9 | 22.4 ± 4.25 | 8.2 | 3.2 | 20.5 ± 4.03 | 9.3 | 3.0 | | | |
| 60 | 9 | 17.8 ± 2.59 | 27.0 | 2.3 | 16.6 ± 4.10 | 26.5 | 1.8 | 15.7 ± 3.99 | 34.6 | 1.9 |

* The estimate of variation is the standard deviation of the items.

to 6.63 for a similar number of replications of cabbage emphasize the large variability to be expected in the analysis of any given vegetable tissue. Difficulties inherent in the sampling process undoubtedly account for some of the variation even though the procedures used were held as constant as possible.

The results of steam table holding and the variations introduced in the preparation of each vegetable, i.e., time held, size of wedges, whether seasoned, mashed, drained, or cubed are presented in Tables 3, 4, and 5. The results of analysis of variance for the effect of replication, method of preparation, steam table temperature, and holding time are presented in Table 6. Under the controlled conditions of this experiment, the total reduction of ascorbic acid in a 100-gm. portion of moist vegetable which is attributable to both cooking and retention on a steam table for 60 min. ranged from 46 to 66 per cent. Changes in vitamin concentration varied with both time and temperature of steam table storage. In all cases except 1-in. cabbage wedges and mashed, buttered rutabagas held at 100°C., there was less than 5 per cent change in the amount of vitamin in a 100-gm. serving portion of cooked vegetable after 15 min. on the steam table. At the end of 30 min., from 8 to 35 per cent less vitamin was found, and at the end of 60 min., from 21 to 49 per cent lower values were obtained. Since vegetables were covered during the storage period, there was little evidence of drying. However, some concentration of solids undoubtedly occurred, which would mean that absolute vitamin losses were larger than these figures indicate, since all tests are reported in terms of moist vegetable tissue.

Scores for eating quality tended to correlate with changes in vitamin concentration. Palatability ratings were high at the 15-min. sampling period, dropped slightly at 30 min., and a further drop was apparent at 60 min.

Higher steam table temperatures did not result in appreciably greater deterioration of vegetables until after 30 min. of steam table holding. Between 0 and 60 min., however, the average drop in ascorbic acid of 100 gm. of rutabaga cubed and drained was 29 per cent at 90°C. and 39 per cent at 100°C. Practically all of this difference developed during the last 30 min. of holding. At the same time, the palatability score dropped from 3.6 to 2.7 at 90°C. and from 2.8 to 2.2 at 100°C. Similar comparisons may be made for each vegetable. Cabbage, particularly, showed from two to three times as much loss of vitamin at 100°C. holding temperatures.

It has been suggested that butter increases the titration for reduced ascorbic acid in cooked vegetables (7, 11). There was no convincing evidence that butter influenced the total ascorbic acid of vegetable tissues in this series of studies. In the case of peas, the destruction of this vitamin was delayed by storing the vegetable in a portion of the cooking liquid sufficient to cover. The buttered, drained product contained as much vitamin as when held drained, without butter. In each case, a correction was made for the effect of dilution when butter was added.

It is generally conceded that butter increases the flavor of vegetables for most people. Buttered rutabagas and peas received higher palatability scores from the judges in this study, but cabbage was equally acceptable with or without butter.

Cooking and holding cabbage in a larger wedge conserved the vitamin at 90°C. holding temperature, but was relatively ineffective at 100°C. Ireson and Eheart have reported that a larger cut surface of vegetable accelerates losses of water soluble vitamins (12).

In order to evaluate the relative importance of the variables introduced into this study, an analysis of variance was calculated, separating the influence of vegetable replication, preparation methods, storage time, and storage temperature, on the ascorbic acid content. The F values obtained and the F values required for one to 100 probabilities are presented in Table 6. That successive cooking lots of the same vegetable vary significantly is clear.

TABLE 6

*F values showing significance of effect of replication, method of preparation, temperature, and time on total ascorbic acid in vegetables*

| HOLDING VARIANT TESTED | RUTABAGA | | PEAS | | CABBAGE IN 3-IN. WEDGES | | CABBAGE IN 1-IN. WEDGES | |
|---|---|---|---|---|---|---|---|---|
| | $F_{.01}$ required | F obtained | $F_{.01}$ required | F obtained | $F_{.01}$ required | F obtained | $F_{.01}$ required | F obtained |
| Replication | 2.15 | 2.88 | 2.20 | 10.62 | 2.30 | 1.95 | 2.30 | 2.56 |
| Method of preparation | 4.78 | 2.15 | 4.83 | 5.21 | 7.04 | 12.00 | 4.95 | 5.09 |
| Steam table temperature | 6.84 | 145.25 | 6.91 | 100.76 | 7.04 | 19.40 | 7.04 | 24.19 |
| Holding time | 3.94 | 131.36 | 4.83 | 140.46 | 4.10 | 3.37 | 7.04 | 23.46 |

There would be less than one chance in 100 that rutabaga and 1-in. cabbage wedges can be sampled so that successive cooking lots are uniform in composition. Likewise, the chances are about one in twenty for 3-in. cabbage wedges and one chance in several thousand for peas that the analysis of successive samples would yield identical ascorbic acid concentrations. The lack of uniformity in successive market samples of peas was apparent and probably accounted for the high sampling variation in this vegetable.

There is less than one chance in twenty that mashing or buttering changes the amount of ascorbic acid retained in cooked rutabaga. Since successive samples of the cooked vegetable can be expected to vary even more, it can be assumed that the preparation methods described in this paper do not unduly influence the retention of ascorbic acid. In the case of drained peas, an appreciable variation in the final vitamin concentration is introduced, depending on whether the cooking liquid is retained or discarded during the holding period. One-in. cabbage wedges were consistently lower in ascorbic acid than the larger pieces. However, except in the case of 3-in. cabbage wedges, the destructive effects of higher holding temperature and increased holding time are such that there is only one chance in several million that time and increased temperature will not produce deterioration of the vegetable.

Results of this kind have certain practical implications. Control of the natural variation in the composition of successive samples of vegetable is an impractical procedure for the institutional buyer. Successive portions of cut cabbage will vary significantly in concentration of a labile nutrient such as ascorbic acid, and any given portion may be high or low as a result of the operation of the rules of chance. Likewise, preparation procedures acceptable to a restaurant trade are influenced, in part at least, by appearance, local taste, and custom. Peas in the cooking liquid may have more vitamin, but they are apt to look messy on a cafeteria counter. On the other hand, holding procedures are a matter of good kitchen management. The amounts of vegetables to be cooked can be determined by the rate of sale at any given time in the service period and can be controlled by the kitchen supervisor. Likewise, steam table temperature can be controlled by readily installed thermostatic devices. Management of these two service factors will appreciably improve the quality of the vegetable served.

SUMMARY

Eighteen replications each of rutabagas, fresh green peas, and winter cabbage were cooked and analyzed for total ascorbic acid after 0, 15, 30 and 60 min. on a steam table.

Steam table temperatures were maintained at 90°C. and 100°C. in two series of nine replications each. The temperature of the steam table and holding time were found to be the two factors causing consistent destruction of ascorbic acid.

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## Excuse It, Please

The editors regret that an error appeared on page 1063 of the December issue of the Journal in an abstract of a paper dealing with the role of the kidney in controlling the excretion of amino acids. The last sentence of the next to the last paragraph should read: "At the latter rate, it is *not* unlikely that undue loss of amino acid nitrogen through the kidney will occur."

### *New Appointments, Veterans Administration*

The following hospital appointments of dietitians (not previously announced) have been made by the Veterans Administration.

| NAME | POSITION | LOCATION |
|---|---|---|
| | *Branch No. 2* | |
| Anna M. Austin | Staff Dietitian | Sunmount, N. Y. |
| | *Branch No. 3* | |
| Mabel Hogan | Staff Dietitian | Aspinwall, Pa. |
| | *Branch No. 4* | |
| Amelia Artz | Staff Dietitian | Oteen, N. C. |
| Carolyn Bass | Staff Dietitian | Richmond, Va. |
| Anna L. Crance | Staff Dietitian | Richmond, Va. |
| Winifred Halvorsen | Asst. Chief Dietitian | Martinsburg, W. Va. |
| Mary K. Kozeff | Head Dietitian | Oteen, N. C. |
| Charlotte Old | Staff Dietitian | Richmond, Va. |
| | *Branch No. 5* | |
| Ella E. DeBusk | Asst. Chief Dietitian | Kennedy, Memphis, Tenn. |
| Mary Freeland | Head Dietitian | Montgomery, Ala. |
| Lucille Gaultney | Head Dietitian | Lake City, Fla. |
| Marthaross Kaufman | Staff Dietitian | Miami Beach, Fla. |
| Lillian Lanzi | Head Dietitian | Mountain Home, Tenn. |
| Katheryn Lindsey | Staff Dietitian | Lake City, Fla. |
| Ada J. McClure | Staff Dietitian | Mountain Home, Tenn. |
| Constance Porter | Head Dietitian | Columbia, S. C. |
| | *Branch No. 6* | |
| Sarah Campbell | Head Dietitian | Ft. Custer, Mich. |
| Ethel O'Dell | Head Dietitian | Chillicothe, Ohio |
| | *Branch No. 7* | |
| Rita Black | Asst. Chief Dietitian | Hines, Ill. |
| Harriet Grunow | Staff Dietitian | Downey, Ill. |
| Helen Ritter | Staff Dietitian | Marion, Ind. |
| | *Branch No. 8* | |
| Janet Burley | Staff Dietitian | Minneapolis, Minn. |
| Betty Jane Harbin | Staff Dietitian | St. Cloud, Minn. |
| Josephine Lynch | Asst. Chief Dietitian | Knoxville, Iowa |
| Bernice Ross | Staff Dietitian | Des Moines, Iowa |
| | *Branch No. 9* | |
| Verna L. Jasper | Staff Dietitian | Wadsworth, Kans. |
| Evelyn Ledbetter | Staff Dietitian | N. Little Rock, Ark. |
| Margaret Schell | Staff Dietitian | Wadsworth, Kans. |
| Bess Woodrum | Head Dietitian | Jefferson Barracks, Mo. |
| | *Branch No. 10* | |
| Mary Jordan | Staff Dietitian | McKinney, Tex. |
| Marjorie Pease | Staff Dietitian | New Orleans, La. |
| Julia C. Wood | Head Dietitian | Waco, Tex. |
| | *Branch No. 12* | |
| Ardith Christiancy | Staff Dietitian | Los Angeles, Calif. |
| Ellen P. Davies | Staff Dietitian | San Francisco, Calif. |
| Ruby L. Grambsch | Staff Dietitian | Whipple, Ariz. |
| Betty L. Hunter | Staff Dietitian | Palo Alto, Calif. |
| Maxine Merrick | Head Dietitian | Los Angeles, Calif. |
| Elaine Shiell | Staff Dietitian | Los Angeles, Calif. |
| Thelma Stinson | Staff Dietitian | Phoenix, Ariz. |
| | *Branch No. 13* | |
| Katherine Bailey | Head Dietitian | Ft. Lyon, Colo. |
| Doris Janssen | Staff Dietitian | Ft. Lyon, Colo. |
| Elizabeth Young | Staff Dietitian | Ft. Lyon, Colo. |

### *Promotions, Army Medical Department Dietitians*

The following Medical Department Dietitians were promoted during the month of December, 1946. They are on duty in Army hospitals in this country and overseas.

*First Lieutenant to Captain*

Burnham, Mary C., R-64
Sansky, Miriam D., R-181

*Second Lieutenant to First Lieutenant*

Barnes, Maude M., R-2346
Carter, Isabel M., R-2291
Casey, Mary C., R-2242
Hutchinson, Dorothy, R-2080
Ice, Rachel M., R-2280
Moran, Elizabeth T., R-2228
Macedonio, Josephine V., R-2314
Oliver, Jane A., R-1389
Sturdevant, Jean E., R-2318
Woodham, Elizabeth V., R-2197

# Editorial

## THE INTERNATIONAL DIETETIC ASSOCIATION

American dietitians have shared the darkest hours mankind has suffered in Europe, Africa, the Philippines, Australia, China, and Japan. From these international contacts has come some appreciation of the courage and contributions of others to the problems of health and feeding of large groups of people. Where American dietitians were able to share problems with dietitians and home economists of other countries, the association was one of stimulation and benefit.

The possibilities for a continuation of this association has occurred to many—but the recent letter from Diana Ten Haaf, president of the Dutch Dietetic Association, bespeaks action. She says:

"During my study in England I also happened to meet—besides the English colleagues—some Canadians and one Australian dietitian. We all enjoyed the international contact very much indeed. On my return to Holland, I suddenly did know that an 'International Dietetic Association' has to be formed. At the moment I only see the big project, namely to establish the 'International Dietetic Association' and to have a general conference once per year or two years—if possible, the first one in Holland!

"The closer personal contact between dietitians from various countries will continue to be helpful to all of us. Moreover, it will contribute an essential element in building toward international cooperation. We, in Holland, are convinced that without such an achievement—in this century of the atomic bomb—little can be done to preserve civilization. I wrote about this question to Miss Broatch, president of the British Dietetic Association. She, too, is enthusiastic at this plan. Will you be so kind to put forward this question to the leading people of the American Dietetic Association and to ask for their opinion? I also will write to the Canadian Dietetic Association, to Australia, New Zealand, South Africa, and all other countries where dietitians are working, even to Germany! Although, we in Holland did suffer so much during the German occupation, I personally do think that we must try again—always and always—and reach out our hand to them."

## THE BRITISH DIETETIC ASSOCIATION

In the late twenties, five dietitians were sent to America on Rockefeller Foundation fellowships, with the primary purpose of returning to Great Britain to start dietetic departments in which more dietitians could be trained. The first hospitals to open dietetic departments were the Royal Infirmary, Edinburgh, the London Hospital and St. Thomas's Hospital for nurse dietitians, and University College Hospital and St. Bartholomew's Hospital, London, which also enrolled science graduates. In those early days, non-nurse students were required to offer a degree in chemistry and physiology and three months' concentrated cookery training to qualify for dietetic training. The hospital training was entirely practical and lasted only six months.

By the mid-thirties the need for more theoretical training became apparent, and a dietetic diploma course was started at the Royal Infirmary, Edinburgh, the Glasgow and West of Scotland College of Domestic Science, and King's College of Household and Social Science, University of London. At first, these courses were open only to science graduates, state-registered nurses, and to trained domestic science teachers if their background of scientific training was adequate. Later it became possible for students holding suitable institutional management diplomas to take training leading to the dietetic diploma.

By 1936 a few senior dietitians working in London founded the British Dietetic Association, and the first annual general meeting was held on May 25 of that year, by which time there were seventy-seven full members, two student members, and thirty-three honorary members. One of the first objects of the Association was the standardization of the various training courses for dietitians and the organizing of all adequately trained women so that they might be recognized as qualified for both hospital work and nutrition work in other fields. A subcommittee was, therefore, appointed to visit all training centers periodically. This work still continues and the recommendations of this committee have contributed materially to recent improvement in dietetic training in Great Britain.

In the early days of the Association meetings were held at regular and frequent intervals and usually dealt with clinical aspects of dietetics. It

was not until the spring of 1939 that interest began to turn to normal nutrition.

The war upset the Association's plans as early as 1938, for the first refresher course originally planned for the Munich week-end in September had to be postponed until the spring of 1939. At the outbreak of war, all meetings, in common with those of other similar associations, were discontinued and people scattered due to evacuations to the country. Dietetic training courses were closed because they were situated in unsuitable places, and it consequently became necessary to permit students to finish their training under dietitians working in unrecognized hospitals. Later on, restrictions imposed by the Ministry of Labour and National Service on the age and qualifications of students permitted to take dietetic courses prevented any trained teachers of domestic science from obtaining dietetic training, and state-registered nurses might do so only with the permission of the Ministry of Health. University students might complete their degrees only if they were not more than twenty years of age in their penultimate year and might subsequently take an approved course of dietetics of one year's duration only.

The profession suffered also from lack of employment opportunities during the war. In the early months of hostilities, many hospitals dispensed with dietitians and much special diet work ceased. Lack of positions in this branch of dietetics led many dietitians to go into the wider nutrition field, and this trend led to the Association's drive for training of dietitians in large scale catering.

All this had a most disrupting effect on a very young organization, and in 1940 all meetings, except those of the executive committee ceased. In 1941, however, regional discussion groups were started and meetings to which outside speakers were often invited were held in various parts of England and Scotland.

As conditions became more settled, owing to the lull in bombing toward the end of 1941, the Association was able to develop a definite three-fold policy, which in large measure is being carried out:

(a) The formation of a strong professional association able to give encouragement and guidance to its members and to provide facilities for meetings and contacts between members;

(b) The improvement of the quality of dietetic training;

(c) The improvement of the status of the trained dietitian.

The Association has grown steadily and membership now numbers 500, and a newsletter has been circulated to its members. Now through an arrangement with the new magazine, *Nutrition, Dietetics, and Catering*, the official news of the British Dietetic Association will be published in a special section each month.

In the field of training, it was possible to reopen in 1942 the diploma courses and the hospital training department, and arrangements for large-scale catering training were made. The Association made further efforts to standardize training, as a result of which the original B.Sc., followed by six months' practical work is no longer recognized as a method of becoming a dietitian. Two further training departments at the Royal College of Nursing for nurses only and later the Leeds General Infirmary for all types of students were opened. Discussions were also initiated regarding the inauguration of a degree in dietetics.

The training now recognized is divided into two parts: (a) the preliminary training including the study of physiology and chemistry, each to an advanced standard, and practical theoretical cookery and kitchen management; and (b) the dietetic diploma course and practical work. There are now six approved courses leading to the dietetic diploma, varying in length from one to one and a half years.

In regard to the improvement of the status of the trained dietitian, in 1944 the Association arranged with the Board of Registration of Medical Auxiliaries for dietitians to become registered as medical auxiliaries. In addition, an approved salary scale for hospital dietitians has been drawn up which is now in fairly general use.

The situation of the dietitian in England today is considerably better than at the beginning of the war, due in large measure to the educational work in nutrition which has been conducted by the Ministry of Food and the awakening of the public and official conscience on hospital food services. The contrast between the dietitian's position at the beginning of the war, when either she could not obtain a suitable position or was even put out of employment, and the present position of repeated advertising of good posts for which no applicants are available is a very interesting reflection of the change of attitude in Great Britain on nutritional and dietetic problems.—*Dorothy F. Hollingsworth, senior dietitian, Technical Offices of Scientific Advisers Division, British Ministry of Food; and honorary secretary, British Dietetic Association.*

## LOANS FOR GRADUATE STUDY FOR A. D. A. MEMBERS

Applications for loans to be made in 1947 from the American Dietetic Association Loan Fund for Graduate Study should be received in the Chicago office of the Association not later than March 1, 1947. The loans, which may be made in any amount up to $1000, will carry 2 per cent interest charges with repayment to be made as soon as possible after the date of the loan. However, it is expected that all loans will be repaid within three

years from the date of the loan. Notification of loans granted will reach recipients before May 1.

To qualify for such a loan, a person must be an active member of the Association for at least two years and be endorsed by a state officer or House of Delegates' representative of the state dietetic association and by one other member of the national Association familiar with the applicant's work in a professional capacity. More detailed information on qualifications and regulations governing the granting of loans may be obtained from the headquarters office of the Association or by referring to the December, 1946, issue of the JOURNAL.

The A. D. A. Loan Fund for Graduate Study originated from gifts by members and friends of the Association. A number of state and local dietetic associations have contributed, including a recent gift of $100 from the Missouri Dietetic Association and $25 from the Tidewater Dietetic Association, Norfolk.

### M. FAITH McAULEY

When news of M. Faith McAuley's sudden death was received by her friends, the first reaction was a feeling of deep personal loss, for she had been a warm-hearted sympathetic friend to many; then, inevitably, came the realization of a great loss to the several fields of her interest and activities.

Miss McAuley's circle of friends was as widespread and varied as were the interests of her active mind, and included friends from her own school days; students who had learned to respect and admire her as a teacher and still valued her advice after becoming known for their own accomplishments; associates in various professional, civic, and cultural groups; and her employees who had learned to love her because of her fairness, integrity, and understanding.

The scope of work accomplished in her long and busy life shows not only her versatility, but her courage, persistence, and adaptability. She was a "born teacher," possessed of an extensive and accurate knowledge of her field and the ability to organize and present in a fascinating manner material which in less skilled hands might have seemed prosaic and uninteresting. She was truly a "teacher of teachers," for her course in marketing at the University of Chicago drew home economics teachers from the colleges of the nation. This course was only one of her responsibilities as professor of institution economics and associate director of resident halls and Commons at the University—a position she held for many years. Later, she lectured at other colleges and universities.

During the depression she was supervisor of all food units of the Federal Transit Bureau of Illinois, where she was responsible for the purchase of equipment and food as well as the planning and service of meals in Chicago and throughout the state. The Red Cross drafted her to organize and direct the purchase, production, and service of food for flood victims of the Mississippi Valley.

Miss McAuley had long been a member of the American Dietetic Association and had been active in Association affairs. In 1931–32 and in 1934–35, she served on the Executive Board as Chairman of the Food Administration Section. Later as committee chairman she directed administration projects in 1936–37 and 1938–39. From 1935–37, she was a member of the JOURNAL Board, and in 1938 was appointed to a three-year term on the Investigation Board. In 1937, she acted as inspector of student dietitian training courses. In addition to appearing on the program of several of the Association's conventions, she wrote a number of outstanding papers on budgeting and administration which were published in the JOURNAL.

Her hospital experience included the teaching of marketing to the student dietitians of several Chicago hospitals for a number of years and the making of a survey of the Dietary Department of a large Chicago hospital.

During the war just ended, Miss McAuley instructed Navy personnel at Indiana University. Later, she organized and supervised employees' cafeterias for several industrial firms.

In her last position, she acted as consultant on food problems for the Tourist and Resort Association of Michigan in cooperation with the Home Economics and Extension Departments of Michigan State College. The bulletins she wrote for this service were of practical and professional value. Her love of teaching and exploring new territory found an outlet in the field work which took her throughout Michigan into hotels, tearooms, and camps for Boy Scouts, lumbermen, and hunters.

This amazing record of achievement did not command all of Miss McAuley's attention. She had a mental curiosity which kept her interested not only in the advances in her own field but in civic and world affairs, and she had the ability to analyze keenly many ambitious but unsound ideas. She loved music and art. Her famous marketing course stemmed from her love of nature and the study of botany, her college major. Most of all, however, she enjoyed her friends who found her a stimulating and lovable companion.

Added to the loss of a true and loyal friend is the regret that Miss McAuley did not have time to finish the book in which her friends had urged her to record her wide and unusual knowledge of food.

As a memorial to her, a number of Miss McAuley's professional associates have suggested that a loan fund for graduate study in food administration be established and many have expressed a desire to contribute to such a fund.—*Ella Eck, University of Chicago Clinics.*

# Current Comment

# Planning the Floor Layout for the Food Service Department—Part II

*Prepared by a Committee of the Food Administration Section of the American Dietetic Association, Mary W. Northrop, Chairman*

*The first section of this three-part report on floor planning in the food service department was published in the January issue of the* JOURNAL. *In it were discussed: How to Start Planning, Receiving and Storage, the Meat and Fish Unit, the Vegetable Unit, the Cook's Unit, the Baker's Unit, and the Salad Unit. Chapters in the present installment include the following topics:*

*VIII. The Diet Kitchen*
*IX. The Cafeteria and Dining Room*
*X. Tray Service*
*XI. The Washing and Storage of Pots and Pans*
*XII. Dishwashing*

*The third section, to be published in the March issue of the* JOURNAL, *will cover material on Garbage and Trash Storage, Provisions for Cleaning, Linen Service, Employees' Facilities, and Offices. Reprints of the first section are now available and those of the second and third sections may be obtained soon after publication.*

## VIII. THE DIET KITCHEN

Not all hospitals need special diet kitchens, for the extra foods required for special diets can be prepared in the different preparation units of the main kitchen. If a diet kitchen is to be provided, it requires no walls and is merely an area in the main kitchen located near the elevators or dumb-waiters, whichever is to be used in transporting the food to the floors for distribution to the patients.

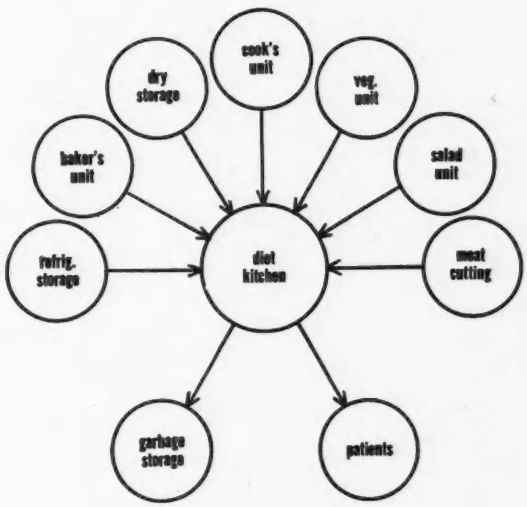
### *Size and Arrangement*

The size of the unit, the provisions for the preparation of cold products and for hot dishes, and the amount and kind of holding or storage facilities will vary greatly with each institution. The volume and variety of products manufactured will determine the requirements of this preparation center. Essentially, however, there is a table, a stove or hot plate, a refrigerator, and a sink. The addition of ovens, mixers, juicers, toasters, a desk, cupboards, and so on, will depend upon the service policy of the organization.

Because of the heterogeneous nature of the work, a parallel unit seems to be the most efficient and least tiring for the worker. That is, the sink, refrigerator, and table space are on one side while the stove and additional table area are on the other. A space allowance of 4 ft. between the two sections is needed.

### *Location*

If the diet kitchen is used for the preparation of the special diet trays as well as miscellaneous extras, it is still set up as an area in the main kitchen. It should also be located at the point of service to the patients (Flow Chart 10). Since the volume of




FLOW CHART 10. *Diet kitchen.*

production is greater, the amount of table, refrigerator, and stove space will need to be larger. Only minor cooking equipment is needed, for the bulk of the food will come from the various preparation units to the special diet area where modifications will be made. In this type of unit more space must also be allowed to provide for the handling of trays and tray carts or racks.

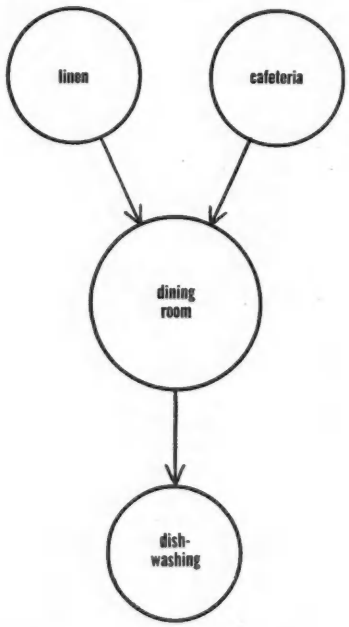
## IX. THE CAFETERIA AND DINING ROOM

### *Location*

The dining room may be located on any level provided it has adequate service facilities, is accessible to the customer, and the light and ventilation are adequate (Flow Chart 11). The psychological effect of eating in a light, airy, attractively decorated room is valuable. A first or ground floor room reduces the necessity of patrons using stairs. All lunchrooms should be located near locker rooms or coat rooms for the convenience of the patron. The corridors leading to the cafeteria should be wide, attractive, and ventilated well enough to allow a line to form comfortably for the service counter.

### *Logical Routing*

The kitchen should, if possible, be located directly behind the service counter. Refrigerators, opening from the cafeteria service area to the salad unit directly behind it, and doors, leading from the cafeteria counter to the kitchen, greatly facilitate the supplying of food to the counter. Two sets of doors allow for one-way traffic each way and for good routing.




FLOW CHART 11. *Dining room.*

### *Dining Space*

The simplest and most economical way to seat the customer is to have one dining room for the workers, clerical employees, and professional personnel. In addition, one or two small dining rooms are necessary for special uses, such as meetings. In a few places, however, the administration or management, with social relationships in mind may feel that some segregation is desired. This is true in Catholic institutions where special dining rooms for the Sisters or Brothers will be required. The general recommendation, then, in any type of institution, is to keep the number of dining rooms to a minimum.

University dining halls also vary in the amount of separate dining space allotted. There may be rooms for employees, for military personnel attending school, for civilian students, for faculty, and other rooms depending upon the amount of special catering done.

In the city school lunchroom, a faculty room may be provided if it is felt wise not to seat the faculty and students together.

### *Determination of Dining Room Area*

In determining the actual amount of space to be devoted to the dining room, the following factors must be taken into consideration:

(a) Total number to be served. The number to be accommodated in any institution is affected by the amount charged for meals, the geographic location in relation to other eating places, the age of the patrons, the type of meal or meals to be served, the season of the year, and the economic status of the customers. In addition to these factors, the amount of subsidy will affect the number of children being served in a school lunchroom. From thirty-five to fifty persons is justification for the maintenance of a school lunchroom (3). Improvised means of serving supplementary foods may be used when the total is below this figure.

(b) Time element. For a cafeteria counter-dining room type of service, the time allowance, as it affects the number served, is also important in determining and planning the amount of space and the seating capacity needed. In universities, all offices and classes close at the same time for lunch. Therefore, pressure is put on all departments of the food service for a short period. In city schools the load may be broken into two, three, or four lunch periods,

depending upon the number of children in the school and the restrictions concerning the number of children to be free at one time. Hospitals attempt to schedule their personnel so that there is someone on duty at all times, but as the opening hour in the cafeteria is most popular, the greatest crowd appears then. School lunchrooms, university dining halls, and hospitals should be prepared to seat three fifths of their expected census at one time.

(c) Seating arrangement. The space needed also depends upon the desired seating arrangement. Whether long tables and chairs will suffice, whether small four-person tables and chairs are adequate, or whether long tables and stools will be used, directly affects the number of square feet of dining room space allowed each person. The square feet of dining room space which should be allotted in the three types of institutions are as follows:

Long tables and stools which can be hung under the tables when not in use are usually used in school lunchrooms. For this, 8 to 10 sq. ft. per child should be allowed. In order that the dining room might also be used as a study hall, library, auditorium, or for other school activities, 10 sq. ft. per person is preferable. Since one purpose of a lunchroom is to serve as a center for teaching proper nutrition and social habits, it should be spacious enough to seat each child comfortably. Crowded conditions tend to encourage poor nutritional and social habits. With proper training in mind, some schools provide six-seat tables with space for two children on either side and one on each end. Chairs are preferred to benches in these schools. From 12 to 14 sq. ft. per child is allowed in this circumstance and in addition to the aisle space between tables, from 32 to 40 in. is added to provide an adequate allowance from table edge to table edge (3).

Large industrial plants using the long table-stool combination allow 8 sq. ft. per worker seated. University dining halls and hospital dining rooms, in which the customers are seated at small tables with chairs, usually need from 12 to 15 sq. ft. per person. If long tables with chairs were under consideration, the minimum figure might be used, whereas the upper limit would be required in using the small four-person tables. In the institution where ambulatory patients are served and where space may be required for wheelchairs, 15 sq. ft. per patient seated should be allowed. Size and shape of tables, style and size of chairs, arrangement of chairs at the table, and placement of tables in the room, are factors which must be considered in determining exact dimensions.

### *Dining Room Serving Pantry*

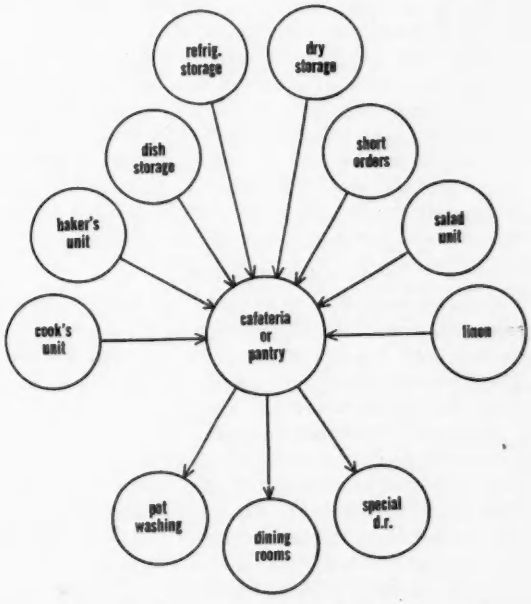
For the dining rooms served by waitresses, a special serving pantry adjacent to the dining room is necessary (Flow Chart 12). The size of such a unit depends on the size of the dining room and on the number of waitresses. The simplest unit should include adequate table space, a sink, and water supply. The more elaborate units for serving larger numbers, such as banquets, include facilities to keep hot food hot and cold food cold. The equipment might include two separate steam or electrically heated tables for rapid service of plates, coffee urns, ice cream cabinets, sinks, and a refrigerated unit for salads and butter. The dishwashing machine should be in or near and in a straight line with the serving pantry. Storage space for all banquet dishes, silver, linen, and glasses is necessary. When planning banquet service, space for a service stairway, space for a freight elevator, a food elevator, loud speaker system, and storage space for banquet tables and chairs should be provided.

### *Relationship of Service Area to Dining Room Area*

The cafeteria service area is one fifth to one seventh the size of the institutional dining room. There should be approximately $1\frac{1}{3}$ sq. ft. of service area for every person seated in the university and hospital dining hall and approximately $\frac{7}{10}$ sq. ft. for the school lunchroom. The service area runs parallel with the cafeteria line and is 9 to 10 ft. in overall width (Fig. 19). The tray slide is 12 in. wide; the counter is at least 24 in. wide; the space from the counter to the back bar is 4 ft.—wide enough for carts and workers to move comfortably; and the back bar itself is 24 to 30 in. wide. The salad refrigerator, also serving the cafeteria, may be in this back wall.

### *Cafeteria Counter*

The cafeteria counter may vary in arrangement and in length in different types of institutions, and




FLOW CHART 12. *Cafeteria or serving pantry.*

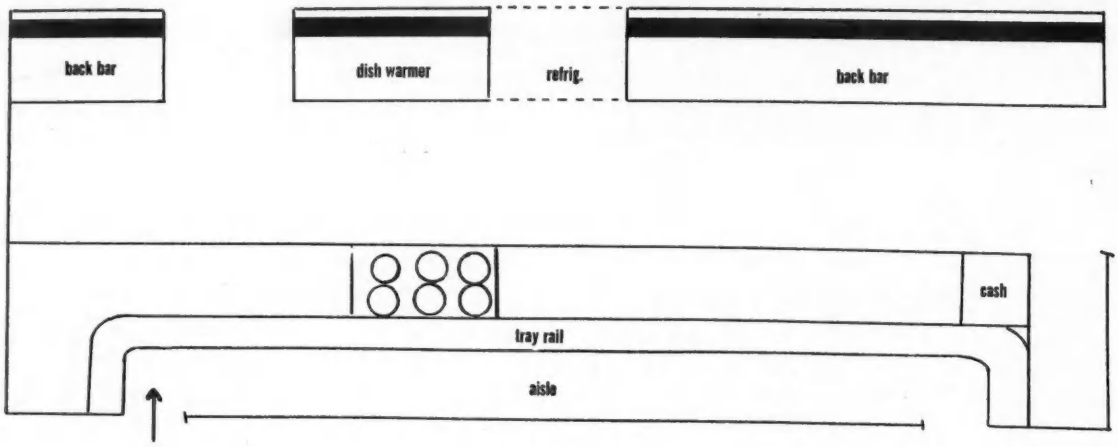



FIG. 19. *Cafeteria.*

within institutions themselves, depending upon the number of persons to be served, the time in which they must be served, and upon the complexity of the menu. The counter space must be sufficient to serve without crowding, and yet not so great as to require more workers or to overtax them.

*Service Speed*

The average school lunchroom cafeteria line can handle from twelve to fifteen persons per minute; the university dining hall, five persons per minute; and the hospital line, three and seven tenths persons per minute. Whether continuous or intermittent service is used also affects the serving rate. With the continuous service used in the school lunchroom, it has been found that more people can be served during a given time. However, if this time exceeds 30 min., the number per minute will be decreased because of confusion in the kitchen and dining room and fatigue of the workers. For more than 30 min. of continuous service, not more than twelve persons per minute can be served. With intermittent service, when the service counter is open and closed alternately during the lunch period, as many as fifteen persons per minute can be sent through.

*Counter Length*

Counter length is determined by number to be served, period allowed for service, necessary speed of service, and type of menu. The average counter length for university and hospital cafeterias is 30 to 32 ft.; for school lunchroom lines, 15 to 20 ft.

The school lunchroom usually maintains a separate cold table which sells milk and ice cream to children who wish to supplement their lunch from home. This would tend to lessen the space required for milk and ice cream on the main counter and thus shorten the counter. Then, too, school lunchrooms serve simple foods with little or no choice. Because each child's lunch is the same, service is much quicker and the line is shorter. Then, too, several feet are saved by omitting coffee urns.

*Improvement of Cafeteria Function*

If an institution is prepared to seat three fifths of its cafeteria census at one time, it should be able to serve quickly, enough people to keep the dining room filled, or at least to prevent the formation of long lines of hungry customers. If, for example, the sending of four persons per minute, or 240 persons per hour, through the line is not adequate, two or more lines are necessary. Many times, however, one cafeteria line may be made to function more effectively by rearranging the placement of food, instructing employees in serving quickly and neatly with a minimum of motions, or physically lengthening the counter in the needed places. Lines have been greatly speeded by lengthening the tray rail at the cash desk and including both a checker and a cashier.

*Arrangement of Cafeteria Lines*

Often there are so many customers that more lines are needed. In this case they may be arranged in several ways. Two lines may meet at the same cash desk; they may run parallel to each other having two cash desks; or there may be one line to one steam table which then branches into two lines, each with its own cash desk (Fig. 20–23).

In some institutions the great numbers to be accommodated in a short period have led to the belief that two smaller cafeterias are better than one large one, since with two greater flexibility in serving may be achieved. The large main cafeteria might have a complete counter with the usual variety of food. The smaller area would be an auxiliary room equipped with a shorter counter which could be used for regular cafeteria service when desired, or for serving the house menu. This meal, which has been planned for the patron, could be served with greater speed and less help.

FIG. 20. *Straight-line cafeteria counter.*

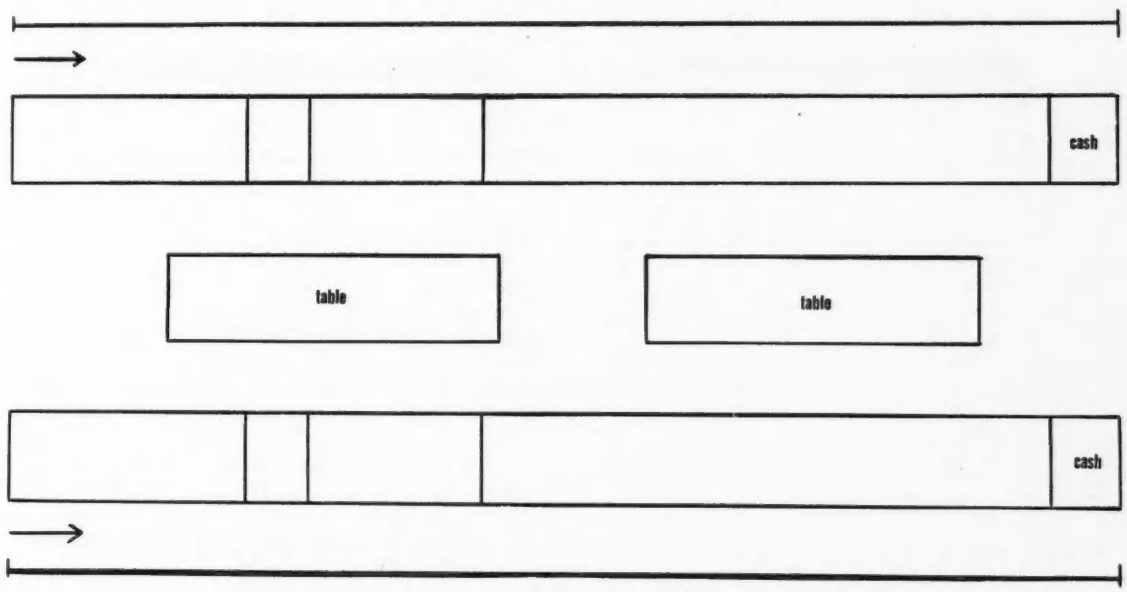



FIG. 21. *Cafeteria counter with two lines, two cash desks, and two steam tables.*

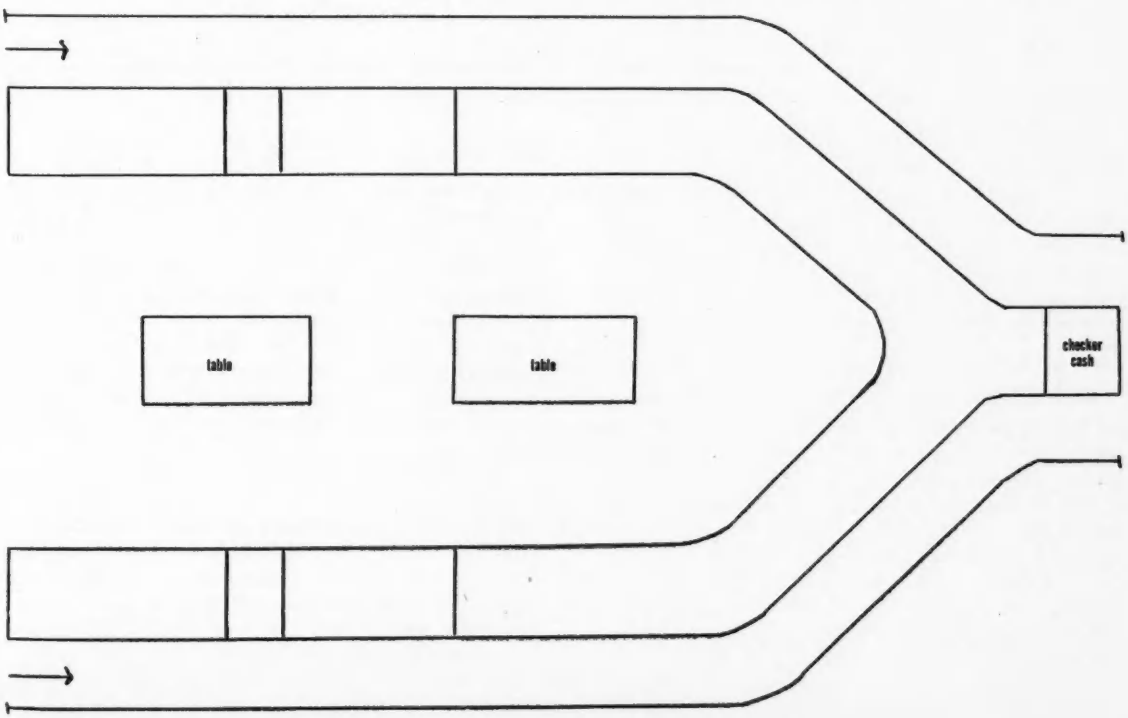



FIG. 22. *Cafeteria counter with two lines, one cash desk.*

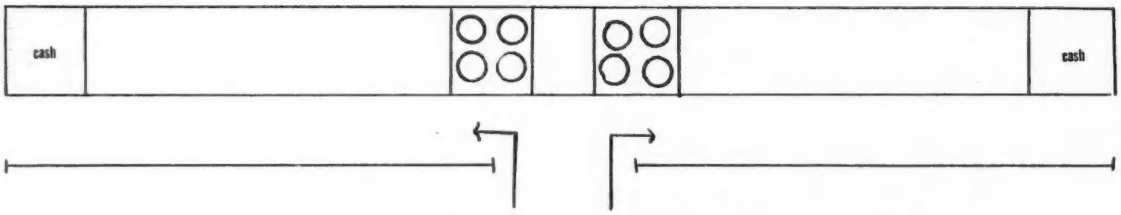



FIG. 23. *Cafeteria counter with two lines, two cash desks, but only one steam table.*

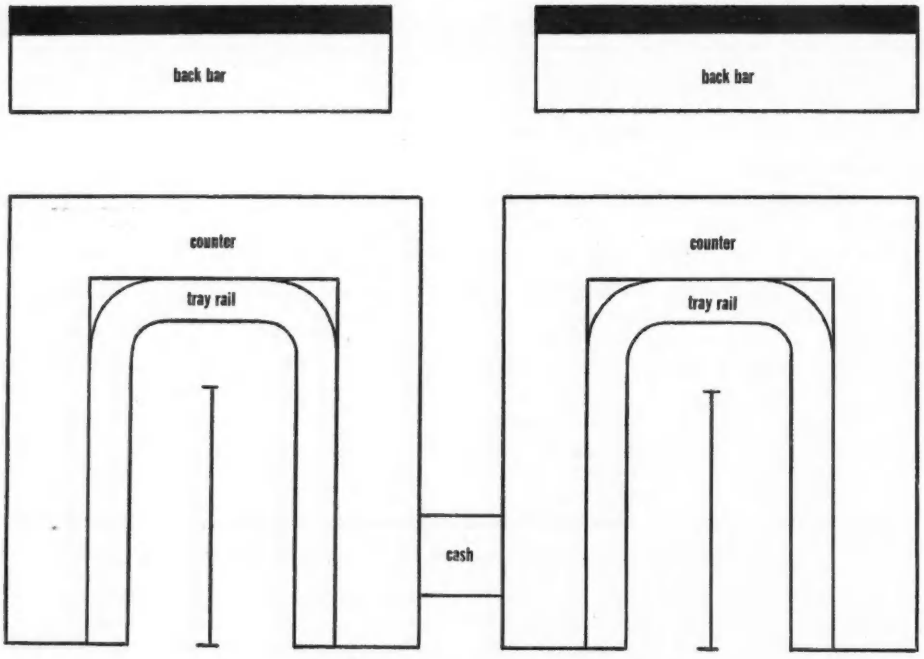



FIG. 24. *Cafeteria with U-shaped counters.*

The school lunchroom, with a large number of children to be served at one time, with a simple menu, and, therefore, with a minimum of counter space needed, can advantageously use compact counters. The counters are U-shaped and as many as four lines can be kept going in a little more than the space which might have held only one counter length (Fig. 24).

*Arrangement of Food on the Counter*

Each cafeteria counter will provide counter space for hot foods, breads and sandwiches, salads and desserts, beverages, ice cream, trays, silver, napkins, glasses, and cash machines. These may be arranged in any order. Many people who operate cafeterias, particularly school cafeterias, prefer to place the unit for hot foods first so that the meal is selected in the order in which it is eaten. In commercial places, including some hospital and university cafeterias, desserts and salads are often placed first since they have a stronger psychic appeal and are the most profitable. The most satisfactory arrangement is for the salad display counter to be directly in front of the refrigerated salad cupboard which opens into the salad unit in the kitchen, and to place the steam table nearest the entrance to the kitchen. In this way the salads will be cold, the hot food will be hot, and both will be easy to replenish. In figuring space allowance for the various food types on the counter, it was found that salads and cold meats, hot meats and vegetables, desserts and beverages need about equal display space. The beverage unit and the ice cream cabinet may be set in the counter to avoid turning around when serving.

The hot food unit should be purchased for the exact size and number of wells needed for the menu to be served. The dish warmer can be located in the back bar convenient to the server. If less than two hundred are served at one time, as in the small grade school, a heated unit may not be necessary. Food brought directly from the cook's unit and served immediately remains satisfactorily hot.

## X. TRAY SERVICE

Hospital tray service may be classified under two headings: centralized and decentralized.

In centralized service all trays for the whole hospital originate from one main serving room or serving unit which is usually adjacent to the preparation areas.

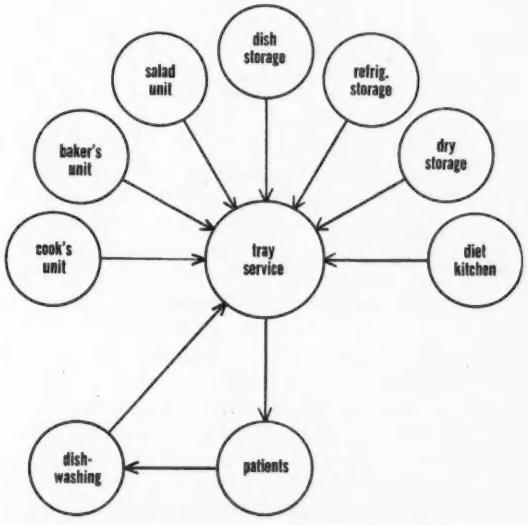
The decentralized type of service usually employs a varying number of heated food trucks to carry bulk food to the wards where the trays are set up and served from a ward pantry. Sometimes the bulk food is sent to the pantries on a dumb-waiter, but the general plan of service is essentially the same. In some institutions, notably in tuberculosis hospitals where the temperature of the wards is such as to chill foods quickly, the hot food truck is wheeled right into the ward for service.

There are several factors which affect the type of service used in a hospital. One is the size of the hospital. A period of from 45 to 60 min. is considered to be the maximum desirable serving time for one meal. If, due to the large number of trays, the serving time exceeds this figure a decentralized service would seem more practical. Some institutions solve this problem by having more than one unit of centralized service.

Another factor which affects the method of tray service is the mode of transportation within the hospital itself. If the building is spread over a large area of ground, the transportation is necessarily horizontal. This makes a centralized tray service impractical and in institutions of this type decentralized service is used.

On the other hand, in the more crowded urban areas where real estate is at a premium, most buildings make use of a small base with many stories. In such hospitals, the transportation is vertical and a central tray service may be used.

On the whole, hospital food service does not differ greatly from any other type of food service. The only points of difference are the service of the food on trays instead of tables and the necessary distance from kitchen to consumer, and even this may be compared to room service in hotels.




FLOW CHART 13. *Centralized tray service.*

### *Centralized Service*

Although no two hospitals having centralized service use an identical system, all use the same general plan (Flow Chart 13). The trays may move on a conveyor belt or they may be pushed manually, but in either case there is a moving line of trays. The food is put on each tray as it progresses, and each tray is checked at the end of the line. They are then loaded on dumb-waiters or subveyors or placed in tray carriers and taken to the floors by a maid using the service elevator. The centralized type of tray service is merely an adaptation of the cafeteria in which the customer, who in this case is the patient, is not present.

The supplies of food for centralized service may be placed either at right angles or parallel to the actual tray line. In some hospitals, using the parallel plan, the cold foods are put on the tray first, from both sides of the line, while in other institutions all the cold foods are put on from one side of the line and the hot foods from the other side. The latter arrangement seems to be the most convenient. It is interesting to note that on the finished tray most of the hot foods are grouped near the bottom of the tray, while the cold items are grouped near the top. If all of the hot food is put on the tray from the same side of the line, the steam table can be adjacent to the kitchen, so that replenishing is a relatively simple matter. The refrigerators for salads and cold desserts may be placed behind the cold side of the line, thereby making them easily accessible to the worker.

The width of the tray line in centralized service, be it table or conveyor belt, will be determined in part by the type of supply used, that is, parallel or right angle. The parallel type of supply will be discussed first. (Fig. 25)

The largest size tray used in private hospitals is 18 by 22 in., and the smaller dimension of the tray should determine the width of the tray line where the parallel supply is used. The width of the serving table on each side of the tray line should not exceed 2 ft. A better width would be $1\frac{1}{2}$ ft. which would make the reach to the tray shorter. It is assumed that the prepared salads, dished desserts, and so on, will be on trays the same size as those on which the food goes to the patients, thus making it possible for the cold food side of the serving table to be

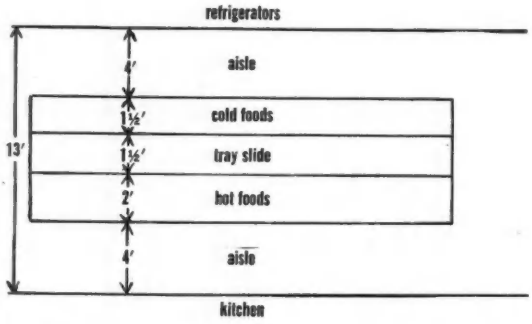



FIG. 25. *Centralized tray service with parallel supply.*

18 in. wide. The aisle behind this serving table should be 4 ft. wide for easy passage and a minimum of walking. It is more sanitary for the reserve supply of food to be placed behind the worker than to be on a shelf beneath the serving table, and it is more convenient if the worker does not need to stoop for each tray of food.

The steam table on the hot side of the line should be 2 ft. wide, and again there should be a 4-ft. aisle behind the table. The reserve supply of hot food should be as close as possible. The location of the serving room in relation to the cook's unit of the kitchen is important. The plates for hot food may be placed in heated cupboards behind or below the steam table or in heated wells built into the steam table.

When the right angle system of supply is used, the tray line can be shorter (Fig. 26). The supply units should not extend more than 6 ft. from the side of the line, the distance a worker can reach without taking more than one or two steps. If the tray slide itself is 2 ft. wide and the supply units extend 6 ft. on either side, there must still be an aisle 4 ft. wide beyond the supply units. A tray line using the right angle system is, therefore, more square in shape, while the parallel system occupies a longer and narrower space.

In making the decision regarding the most desirable type of supply, the shape of the area will be the determining factor in many cases. When the right angle supply system is used, the supply units on opposite sides should be staggered to avoid collisions.

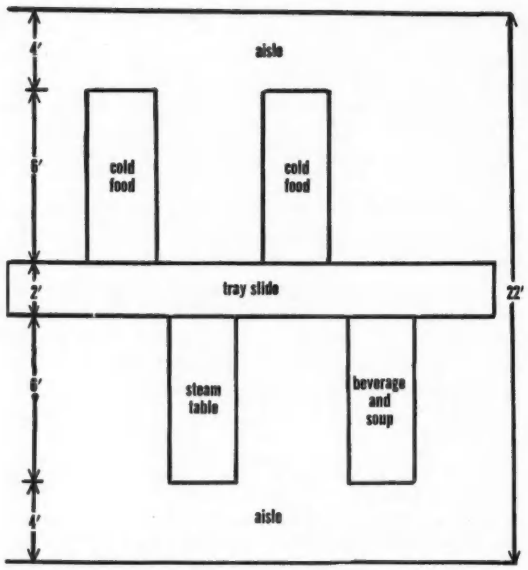
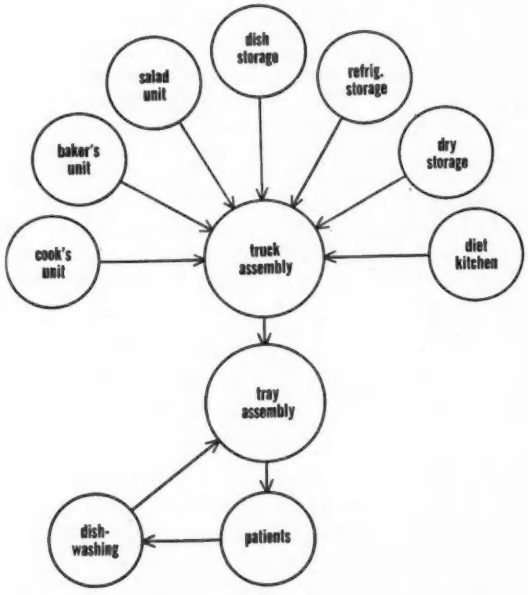



FIG. 26. *Centralized tray service with right angle supply.*




FLOW CHART 14. *Decentralized tray service.*

### *The Pantry in Decentralized Service*

When planning the serving pantry it is necessary first to know how many trays are to be served from each pantry. From the standpoint of the nursing department, a unit of from thirty to thirty-five beds is considered standard for good nursing care in a general hospital. The serving pantry can be built to serve one such unit or, if there are two such units on a floor, one pantry may serve both units, thus making the number of trays sixty to seventy. When one pantry serves two units, it should be located between them to shorten the distance the trays must be carried. The pantry should be as close as possible to the service elevator if the food is sent up on trucks, and if a dumb-waiter is used, it should be in the pantry itself (Flow Chart 14). A dumb-waiter in the pantry, even though the food comes u]

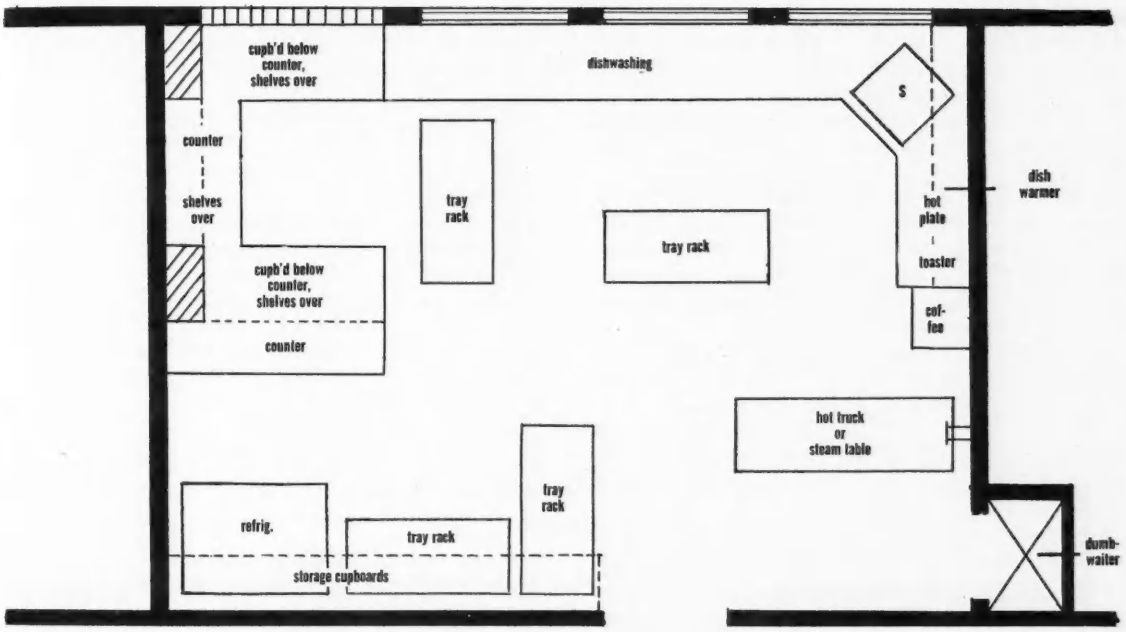



FIG. 27. *Pantry for sixty to seventy trays as used in decentralized tray service.*

on trucks, is an added convenience worth considering. The pantry should be large enough to provide space for storage of dishes, both heated and cold, and of other equipment and supplies, a sink with a double drainboard, a small stove or hot plate, and a refrigerator. A toaster and a coffee maker should be provided since these foods should go to the patient fresh. When decentralized service is used, decentralized dishwashing should also be provided. A space 10 to 12 ft. long and 2 ft. wide is the accepted size for such a unit.

The unit where the trays are set up with cold food should be U-shaped. It should not be more than 4 ft. wide so that the worker will not have to do any walking. The counters on the three sides should be 2 ft. wide. Dishes for cold foods may be stored above one counter and trays of dished desserts, prepared salads, and so on, can be placed on shelves on each side of the "U" (Fig. 27).

The arrangement of the items within the setting-up unit should be as convenient as possible. Time and motion studies have shown that a worker should work with both hands and that both hands should either move toward the work center or away from it at the same time. It is for this reason that shelves for prepared salads, desserts, and so on, are placed on both sides of the worker. The trays, when set up with cold food, should be placed on tray racks which can be moved around easily. These tray racks should be wide enough to take the length of a tray (2 ft. is sufficient) and long enough to take at least three and not more than four trays. The tray racks can be made with six shelves, thus making it possible to have from eighteen to twenty-four trays on one rack. In a pantry serving only thirty to thirty-five trays, only two tray racks would be necessary, but when sixty to seventy trays are served three or four racks would be needed. One tray rack may be moved into position at the open end of the U-shaped setting-up unit so as to make a hollow square within which the worker sets up the trays with the cold food. As each tray rack is filled, it can be moved and another put into place to be loaded.

The hot food may be handled in one of two ways. The first, and most satisfactory, is with a heated truck. The truck is heated and loaded in the kitchen and sent up on the service elevator to the pantry. There should be an electrical outlet in the pantry where the truck may be connected so the food will be as hot as possible while trays are being served. The hot food truck should be so located that the food can be served across it as it is served across a cafeteria counter.

When the hot food comes up on a dumb-waiter, a steam or electrically heated table is necessary. It can be placed in the same position in the pantry as the hot food truck, the only difference being that the truck can be moved and the table is stationary.

In allowing floor space in the pantry in addition to that needed for equipment, there are three important points to remember:

(a) A clear space 3½ to 4 ft. wide should be allowed in front of counters, dishwashing unit, refrigerator, dumb-waiter, and on each side of the hot food truck or heated table.

(b) There should be enough room to turn the tray racks around without moving other racks or the hot truck.

(c) The door to the pantry should be 3 to 3½ ft. wide to allow for easy passage of the trucks.

The pantry plan shown in Figure 27 is only a suggested plan to demonstrate that pantries must have ample space. The plan shown has 350 sq. ft. of floor space, which is adequate for sixty to seventy trays. If the pantry is to serve one rather than two nursing units of thirty beds, it will still need the same equipment except that only two tray racks will be needed. The length in this case can be reduced by about 3 ft., making 300 sq. ft. sufficient.

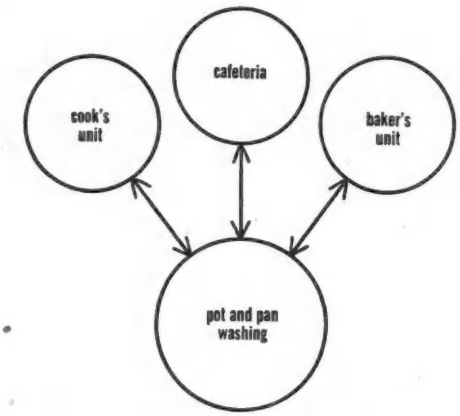
*Truck Area in Decentralized Service*

Centrally located in the kitchen and in a direct unimpeded line with the exit, an open area should be left for truck storage and loading. This is the working area of the person who cares for the trucks, and he will need a double sink with drainboards, as well as space enough to move freely among the parked trucks. The number and position of the trucks must be predetermined so that electrical connections may be provided.

## XI. THE WASHING AND STORAGE OF POTS AND PANS

*Location*

This area should be so placed that it is easily accessible from the cook's area and also from the baker's area, if it is to be used by both (Flow Chart 15). On the whole, it is considered advisable to employ separate sinks except in small institutions, since it is unlikely that the two areas would be close enough for the same sink to be used conveniently and efficiently. This recommendation is also based on the fact that utensils used by the baker are apt to be more sugary and less greasy than those used in the cook's unit.




FLOW CHART 15. *Pot and pan washing.*

*Size and Arrangement*

The sink should be set either at least 2 in. away from the wall to facilitate cleaning, or set back to back, maintaining that this is conducive to more sanitary conditions under the sinks and that it lessens the cost of plumbing as well. Also for encouraging tidiness as well as improving ventilation and illumination and conserving space, it is advised that the pot and pan area be located directly in the main kitchen and that it not be separated by walls. There is some indication that the most satisfactory results are obtained when $\frac{1}{10}$ sq. ft. per person fed is allotted in large institutions, increasing to $\frac{3}{10}$ sq. ft. in very small institutions, provided that no scullery is less than 40 sq. ft.

The sinks in this area should be provided with a splash back, drain boards, and grease trap. The washing and rinsing compartments of the sink should be approximately 24 by 24 in. and 12 to 14 in. deep. An area larger than this is usually unnecessary except for soaking which requires more room. The smaller type, besides being adequate, will encourage a more frequent change of water, thereby resulting in more efficient pot and pan washing. It is advised that the pot and pan area be equipped with a sink with three compartments. In this way a sink is provided for the three steps: soaking, washing, and rinsing. A sink with two compartments may be employed, but will not be as efficient. A single sink is not recommended, even in the small institution, for the employee would not have sufficient work space to do the job.

It is advisable to have a rack or table in this area so that soiled pots and pans will not be put on the floor and also a rack for clean pots which is accessible both to the cook and to the pot washer. It may be more practical to substitute a truck for the soiled pot table. In this way the cook can load the truck with soiled pots which are then transferred directly to the pot washing area. In some kitchens

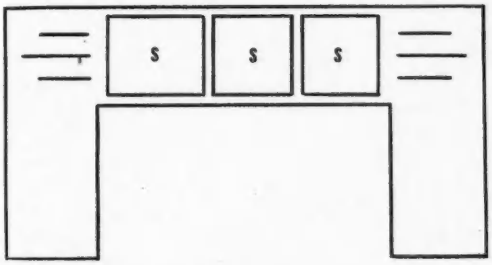



FIG. 28. *U-shaped pot washing unit.*

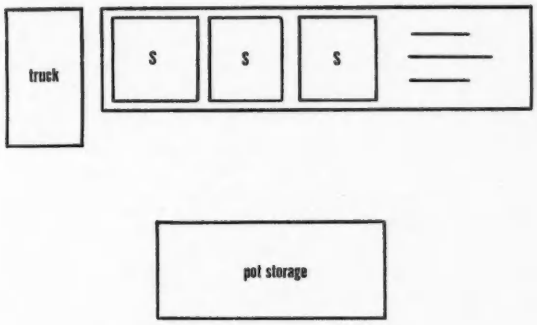



FIG. 29. *Straight-line pot washing unit.*

this soiled pan area may be a drainboard adjoining and sloping towards the soak sink. The size of this drainboard will be influenced by quantity and size of soiled pans to be accommodated, which, in turn, depends on the menu, number of people served, and speed of the worker. From 10 to 20 sq. ft. should be adequate for most institutions. There should also be a drainboard of approximately the same size on the opposite side sloping towards the rinse sink. Here the utensils may be placed as they are removed from the rinse water.

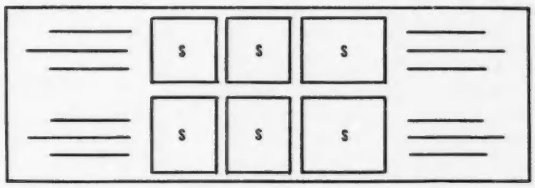



FIG. 30. *Double pot washing unit.*

In connection with this unit there should also be an adequate area for the storage of clean and dry utensils. It may be located in a separate rack, which may be above the cook's table or below it. The latter is not considered advisable because of the chances of contamination of the utensils from the floor dust. The clean pot storage should be located as close to the cook's unit as possible, and for this, proximity to the pot washing area may be sacrificed.

The aisle between the pot and pan area and adjoining units or between the sinks and storage area should be 4 ft. wide, so that the employee may move the pots and pans around without being cramped.

Line drawings are included to show some of the various methods of arrangement of this unit. The U-shaped unit (Fig. 28) is the most economical of space. Here the soiled and clean tables are parallel and opposite each other at right angles to the sinks. This is in contrast to the straight-line type where the utensils flow from the soiled to the clean area in a continuous path. Figure 29 illustrates the straight-line type with the addition of a movable soiled pot truck and storage space for clean utensils. The double type of free-standing sink where one employee works from right to left while the other works from left to right is shown in Figure 30. One soiled and one clean pot table serves both employees. A triple compartment sink is shown in each instance as this is the type recommended in this study.

## XII. DISHWASHING

In the dishwashing area, special attention must be given to acoustic treatment, ventilation, and sanitation. Acoustic treatment may need to include more than the ceiling, since the dishwashing process is of necessity very noisy. Ventilation is extremely important and must provide for draining off steam. Construction, surfacing materials, and equipment are all involved in sanitation. However, at the time of drawing the floor plan, the major factor to be considered is space. All equipment should if possible be free-standing.

Cafeterias and dining rooms will have centrally located dishwashing units. However, in the hospital where tray service may be either centralized or decentralized, the dishwashing should coincide. That is, with decentralized tray service it is advisable to provide for decentralized dishwashing in the ward pantries. This eliminates the waste of time and effort whereby soiled dishes are removed from the point of service to a central dishwashing area and returned clean.

### *Size*

Some authorities state that the optimum size was found to be 1 sq. ft. per person allotted to the dishwashing area. If at all possible, a large enough area should be provided so that equipment may be located away from the wall, for with a free-standing

unit the employee can approach the machine from either side. This increases the load capacity and facilitates cleaning and vermin control.

Ample table space cuts down breakage. No exact size can be recommended, for this depends on the number of soiled dishes delivered at one time and the speed with which they are delivered from the dining area. The speed with which the dishes are removed from the soiled dish table is also a factor. If the machine is operated at top capacity by an optimum number of employees continually feeding the machine, less soiled dish space will be required. If the dishes are delivered to the area at a rate faster than they can be sent through the machine, more soiled dish space will be required. The section should be large enough to prevent jamming, yet small enough to avoid waste of effort. The most efficient tables are approximately 24 to 30 in. wide at a height determined by the machine, with 60 per cent of the total space allocated to the soiled dishes and 40 per cent to the clean dishes. It is important that the dishes be allowed to dry thoroughly before stacking. For this reason the clean dish table should accommodate at least three dish racks for a small- or medium-sized machine, and more for the larger models. Here again crowded conditions make for inefficiency. If a conveyor is used, it should carry the dishes directly to and from the washer.

A single-tank machine may serve satisfactorily in small departments, but a two-tank machine is recommended for better sanitation. This type has the advantage of allowing for different temperatures for washing and rinsing. There are several factors which influence the size of machine. The amount and type of work to be done is of primary importance. This in turn is influenced by the number of people served, the time allowed to accomplish the job, the type of meal service, and the type of menu. If food is served elaborately, a larger machine will be required to serve a given number.

Along with the dishwashing machine there are several auxiliary pieces of equipment that should be located in the dishwashing area. Provisions for prerinsing of dishes and for washing glasses and trays must not be overlooked. An area approximately 2 ft. square will accommodate a glass washer which has revolving brushes for washing and a force spray for rinsing. It is preferable to wash trays in the machine where they are cleansed quickly and efficiently, although this may be done in a separate sink. A sink of standard size, 24 by 24 by 12 in., should be adequate. Such a sink is also necessary for miscellaneous soiled articles that appear in the dish room or for soaking dishes requiring special attention. Floor space should be provided for one or more dish trucks in the dishwashing area. There should be room near the soiled and clean dish tables for the employee to wheel the truck in and out.

It is essential that a hospital provide for sterilization of trays returning from patients suffering from contagious diseases. This is usually done before the trays return to a central dishwashing unit.

### *Shape*

Flow Chart 16 shows that the dishes travel in a triangular path—that is, from the dishwasher to the service area, then to the dining room, and finally back to the dishwasher. Materials from other areas on the other hand flow in a progressive line. Line drawings are also included to show some of the various possibilities of arrangement for this department. Figure 31 demonstrates the straight-line type of dishwashing equipment where the dishes are received, scraped, sent through the dish machine, and

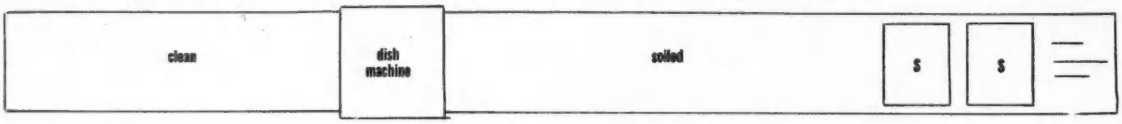



FIG. 31. *Straight-line dishwashing unit.*

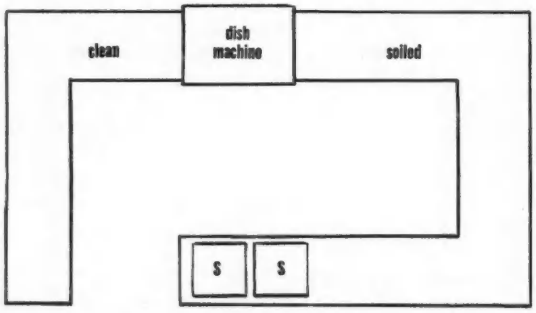



FIG. 32. *Hollow square dishwashing unit.*

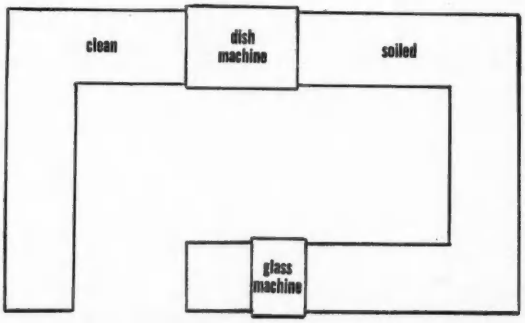
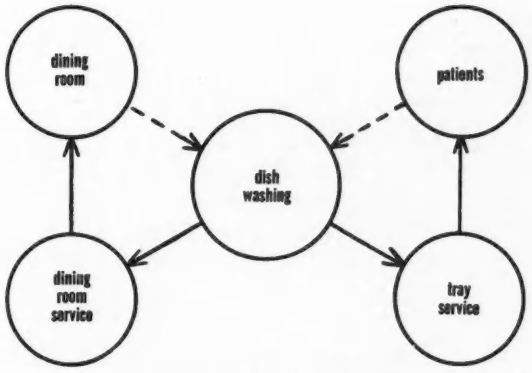



FIG. 33. *Dishwashing unit with glass washing machine.*




FLOW CHART 16. *Dishwashing.*

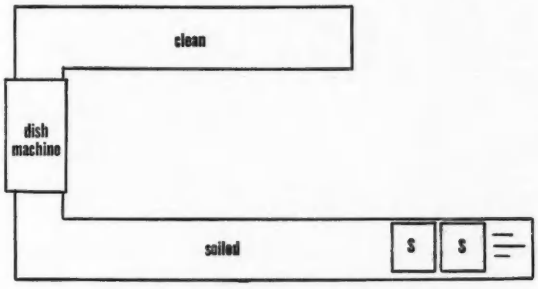



FIG. 34. *U-shaped dishwashing unit.*

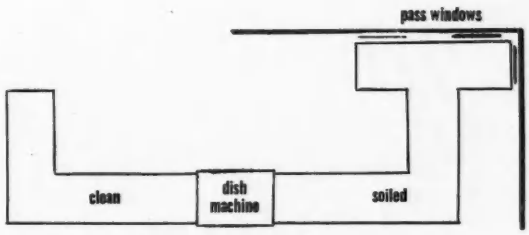



FIG. 35. *Dishwashing unit with double pass windows.*

on to the clean dish table, all from the same direction. This type is desirable when the space available tends to be long and rather narrow. However, there should be a 4-ft. aisle on each side of the equipment. When more width is available the square or box type may be employed, as shown in Figures 32 and 33. The addition of a glass washing machine to the set-up is also shown in Figure 33. The third type, the U-shaped unit, is illustrated by Figure 34. The area assigned to soiled dishes should be easily accessible to the dining area or the place where patients' dishes are returned to the kitchen. Figure 35 shows the use of a double pass window for the return of soiled dishes. This type is practical for a school lunchroom where students return the dishes themselves.

REFERENCE

(3) GODFREY, R. S., AND SHORT, G.: Recommendations for lunchrooms. The Nations Schools 37: 34 (January), 1946.

## *Army Medical Department Dietitians Recalled to Active Duty*

The following Medical Department Dietitians, previously reported as separated, have been recalled to active duty.

1st Lt. Mary L. Davidson, R-2139
1st Lt. Louisa B. Harrison, R-923

## *Army Medical Department Dietitians Separated from the Service*

The following dietitians have been separated under the provisions of the Separation Policy established by the Surgeon General for Medical Department Dietitians.

*First Lieutenants*

Benes, Elsie E., R-1215, Dayton, Wyo.
Bernholtz, Bonnie N., R-2175, Page, Neb.
Cubillas, Carlota M., R-1011, 153 N.E. 44th St., Miami, Fla.
Dorris, Josephine L., R-1409, 229 Ash St., Winnipeg, Canada
Dwyer, Mary C., R-2134, 704 Minnesota St., Redwood Falls, Minn
Gaasch, Vera D., R-2081, 1122 W. Oak St., Ft. Collins, Colo.
Hendrickson, Mary E., R-2184, 3300 Woodland Ave., Ames, Iowa
Henry, Charlotte H., R-2137, 224 Hoyston St., Arkansas Pass, Tex.
Kopec, S. Virginia, R-2115, 626 E. 29th St., Erie, Pa.
Leahy, Margaret I., R-2025, 4029 Flad Ave., St. Louis 10, Mo.
Long, Anna M., R-1122, 423 W. Market St., Harrisonburg, Va.
Perteit, Loraine W., R-2066, 800 Spring St., Elgin, Ill.
Spain, Dorothy, R-2159, Belgrade, Mont.
Tainton, Dorothy N., R-2039, 30 Mountain Ave., Summit, N. J.
Waldmiller, Frieda P., R-2196, 116 Dean St., N.E., Grand Rapids, Mich.

*Second Lieutenants*

Acker, Janet J., R-2201, 431 E. Third St., Dayton, Ohio
Banks, Mary G., R-2459, Route 4, Manor, Tex.
Harris, Myra, R-2431, Trenton, Ky.
Jones, Neoma B., R-2468, R.D. 2, Williamsfield, Ohio
Messe, Rebecca R., R-2211, 53 Merrall Rd., Far Rockaway, N. Y.
Park, Geraldine B., R-2394, 638 College Ave., State College, Pa.
Price, Sara N., R-2290, Newville, Ala.
Roberts, Edith, R-2472, 417 State St., Colfax, Iowa

# Book Reviews

**The Modern Treatment of Diabetes Mellitus.** By William S. Collen, B.S., M.D., and Louis C. Boas, A.B., M.D. Springfield, Illinois: Thomas Publishing Company, 1946. Cloth. Pp. 514. Price $8.50.

The authors' basic concept of modern diabetic treatment is to bring the patient to a condition where he is free of hyperglycemia and glycosuria on "a diet which contains the nutritional components equal to what the normal organism requires." This is a commendable goal, and the book would indeed be a "practical guide for the general practitioner who treats diabetic patients" if it demonstrated how this end could be reached by proper management of diet and insulin. Unfortunately, the directives given are ineffective for achieving this end.

Even though a large part of the book is devoted to dietary discussions, the reader finds a large number of sample diets and reference to a "simple calculator," instead of an intelligent introduction to nutrition and food values. The diet calculator pocketed in the cover of the book is purportedly to enable the physician to give "diet instructions" to the patient. The "simplicity," however, of this "automatic dietitian" is obtained at the expense of gross inadequacy in mineral and vitamin content of numerous diets, unnecessary rigidity, and the lack of an interpretative approach.

The gross inadequacy in calcium, phosphorus, and vitamin results from insufficient amounts of milk and other protective foods in the dietary prescriptions as well as from lack of appropriate instructions. It is of interest that the authors have chosen to recommend vitamin pills in some instances rather than to improve the adequacy of the diet through proper food selection. However, no medication has been suggested to improve the mineral content of the diet. Furthermore, if a practitioner should wish to insure the adequacy of mineral and vitamin intake through proper food selection, he would find it difficult and in some cases impossible with the data on food composition given.

The rigidity of the diet calculator is due in part to the limited amounts and kinds of food items used, as well as the limitations imposed by the food substitutions suggested. Certainly the inadequate food composition data prohibit a comprehension of the diet in terms of minerals, vitamins, carbohydrates, and fat, as well as any elasticity in dietary recommendations.

For the insulin treatment, the authors set two rules which complicate rather than facilitate the return of the diabetic to normal eating schedules. Because of the possibility of hypoglycemic reactions, they recommend placing the patient who receives insulin on intercibal feedings, thereby replacing the usual three meals of the healthy individual by four, five, or six meals for the diabetic. The assumption on which this treatment is based is that unmodified insulin causes a lowering of the blood sugar which lasts for 4 hr. after administration and that absorption of food lasts only 2 hr. However, these are theoretical figures. Certainly the postprandial hyperglycemia of the diabetic is longer than 2 hr. and proper insulin management should be short of the danger of hypoglycemia.

Unfortunately, such theoretical figures as the glucose-insulin equivalent are recommended as guides for the insulin dosage. Such a concept is of questionable value when based on a comparison of glucose excreted and insulin required, as some authors do. It becomes not only of no practical value but is actually dangerous when related to the available glucose in the diet as by Collen and Boas. Certainly, under such a regime hypoglycemic reactions must be anticipated.

One wishes, too, that a book devoted to the instruction of the inexperienced physician had been given more careful editing or proofreading. For example, the peak of the normal glucose tolerance curve should not be higher than 180 mg. per cent—not 108, as printed.

It must be mentioned, on the other hand, that the book contains valuable and instructive chapters, particularly on diabetic complications and on the management of the cardio-vascular diseases of the diabetic. It is also well illustrated.

**Mother and Baby Care in Pictures.** By Louise Zabriskie, R.N. 3rd ed. Philadelphia: J. B. Lippincott Company, 1946. Cloth, spiral bound. Pp. 203. Price $2.00.

Since 1935 this book has fulfilled a need for scientific and authoritative information concerning child birth. While it was written primarily for expectant mothers and fathers, it has also been used as a maternity guide for practical nurses as well as by registered nurses who are teaching classes for mothers and by high school students in health and nursery education.

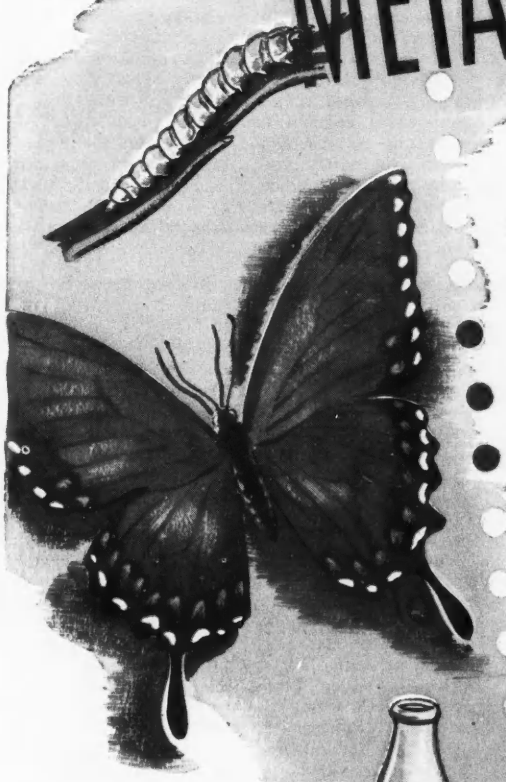
In this new revision, an increased emphasis has been made on nutrition with respect to its value during pregnancy and at the time of labor and delivery, its contribution to convalescence, and its effect on the ability of the mother to nurse her baby.

The section on handling the baby, breast feeding, artificial feeding, formula preparation, weaning the baby, and addition of new foods is complete, accurate, and understandable, in addition to being attractively illustrated. As Dr. MacEachern has written in the introduction, "This valuable text, with its excellent illustrations will go far in educating the public in the right direction. Because of its simplicity and intelligibility, each of the vital subjects discussed becomes a practicable course in adult education." Certainly the dietitian or nutritionist who is working with individuals or groups will welcome this as an authoritative and useful reference.

**Food Values of Portions Commonly Used.** By Anna dePlanter Bowes, M.A., and Charles F. Church, M.D., M.S. 6th ed. Philadelphia: College Offset Press, 1946. Paper. Pp. 58. Price $1.60.

This book continues to serve its original purpose, i.e., to supply authoritative data on food values in a form for

# METAMORPHOSIS *of Milk*



Rennet-custards are visually more attractive by virtue of their diversity of colors and toppings . . . more tempting to the palate because of their flavors and consistency . . . and digestively more acceptable than unmodified cow's milk because of their smaller, more friable curds.

In infancy and childhood, in certain gastro-intestinal diseases, in pregnancy and lactation and for geriatric patients, milk is a dietary "must". However, because of the patient's aversion or intolerance, it often proves inadvisable to insist upon the ingestion of an adequate intake of unmodified cow's milk in the usual liquid form.

In such cases, the metamorphosis of milk into delicious rennet-custards (quickly and easily prepared either from "Junket" Rennet Powder or "Junket" Rennet Tablets) has been found a highly welcome solution of the problem—from both a psychologic as well as physiologic point of view.

**"JUNKET" BRAND FOODS**
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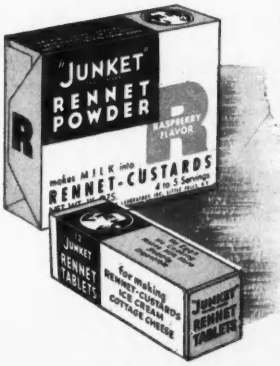


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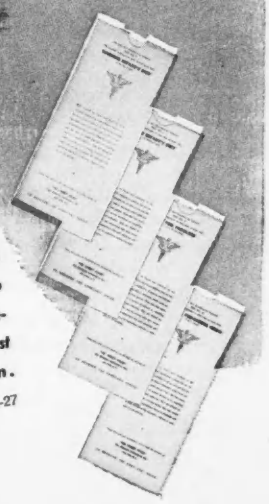

easy reference. The new revision contains numerous important changes. The figures on food composition have been brought up-to-date; the number and kinds of foods have been increased; many staple foods used in other countries have been added; new data on prepared foods have been added; the latest Recommended Dietary Allowances are given; and the section on values of food as purchased has been greatly expanded.

**Nutrition and Diet Therapy.** By Fairfax T. Proudfit and Corrine H. Robinson. 9th ed. New York: Macmillan Company, 1946. Cloth. Pp. 781. Price $3.75.

The authors present a completely rewritten version of this widely used textbook for nurses. Important additions have been made on food poisoning, food preservation, food legislation, and feeding the aged. Suggested projects have been added at the end of each chapter together with a brief bibliography and review questions. Tables on food composition have been brought up-to-date, and the table on physiological constants has been completely revised. The greatest simplification has been made in the section on diet therapy, in line with the modern trend toward fewer therapeutic diets.

**Hygiene.** By F. L. Meredith, B.Sc., M.D. 4th ed. Philadelphia: The Blakiston Company, 1946. Cloth. Pp. 838. Price $4.

The acceptability of this textbook on physical and mental health from personal and public health aspects is well established for college students. Changes have been made in content and in the arrangement of material to incorporate new developments of science and to present the material more logically.

Three introductory units deal with the health situation existing in this country today, its strength and its weakness; the body itself; the nature of disease and the processes of recovery; and the forces of medical science and public health available for the attack against disease and the promotion of health. The remaining chapters are all on health topics, each having its personal phase and its public phase. The sections on nutriment and nutrition, the daily diet, digestion, the teeth, and weight control are all pertinent, concise, and clearly presented.

Since an effective solution to the food and nutrition problems of patients and laymen cannot be successfully isolated from other phases of hygiene, this book will be of particular interest and value to dietitians and nutritionists who wish to have an up-to-date review of what health *situations* exist in the lives of individuals, what health *objectives* arise from them, and what *action* is scientifically appropriate.

**Developing Your Executive Ability.** By Howard Smith. New York: McGraw-Hill Book Company, Inc., 1946. Cloth. Pp. 222. Price $2.50.

The author of this book, himself a personnel consultant, has made a comprehensive study of the characteristics of a good executive by meetings with hundreds of successful men and observing the qualities they possess which make them leaders in their respective fields. This book will be of especial interest to the individual who is concerned with getting out of a rut and in advancing toward a particular goal. Mr. Smith endeavors to point out how this may be done by outlining the steps to be taken.

To do this, a sincere desire to advance is first needed; then a successful executive personality must be developed—that is, a "personality of leadership, flowing out of a rich and sympathetic understanding of human nature."

Twelve of the most important characteristics of a good executive are discussed separately to show how they may best be developed in an individual. A self-rating scale for executives is included, and the book concludes with close-ups of some fast-climbing executives and the methods they used to achieve their promotions. A list of visual aids which may be used to supplement the material in the text is also included in the bibliography.—*Katherine E. Louser, chief dietitian, Norristown State Hospital, Norristown, Pennsylvania.*

**How I Feed My Friends.** By Max White. New York: Duell, Sloan & Pearce, Inc., 1946. Cloth. Pp. 167. Price $2.

It would seem that the author, apparently well known for other types of writings, is a little out of his element in offering a cook book. In his own words, "Back in the thirties, someone wanted me to write my autobiography, but I thought I could probably make more money by not writing it and anyway I was not tempted. I am still not tempted, but am writing a cook book instead and it will not 'tell all' but probably a few things. I shall have to see how it works out." In this reviewer's opinion, there seems to be little "working out" except that it *was* published.

Purportedly and possibly admittedly, the book is a collection of recipes for Sunday night suppers. However, its organization is lost in a maze of more or less uninteresting anecdotes which meander hither and yon among the recipes in a rambling, monotonous absorption in the first person singular pronoun. For example, Mr. White skips blissfully from a dish called "peppers and eggs" to sauces, with apparently little thought of continuity. In talking about variations of dishes, the author seems to be somewhat vague about amounts and substitute ingredients, leaving it all to the ingenuity of the reader or cook, thus making the book, as a book, somewhat useless. The selections of recipes also leave one only luke warm with little desire to rush right out to the kitchenette and start cleaning the food. Only a few have even tempting names, although a number are supposed to be foreign dishes loved by true gourmets.

In all fairness to the author, the physical unattractiveness of the book probably has a great deal to do with the emotional vacuum engendered on handling it. The jacket is an uninteresting tan with little life. The paper on which the text is printed is little better than newsprint. A nicely designed jacket, line drawings to illustrate some of the recipes or anecdotes, and an attractive format would have done much to urge the reader to try some of the dishes.

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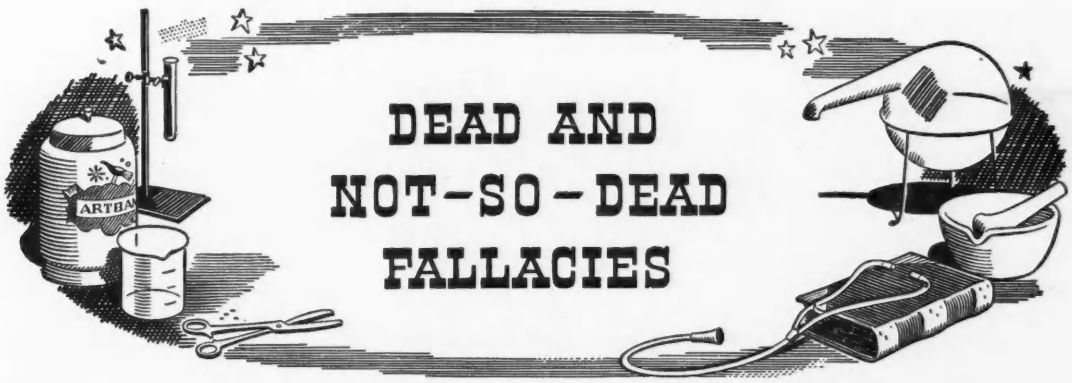
Dietitians may request the services of the A. D. A. Administrative Adviser on location. She will study the particular problem and make recommendations. The visits made must, of necessity, be limited in number as well as length of time. Whenever possible, the desired information should be obtained by correspondence or personal office visits.

The details of this service will appear in the March JOURNAL after discussion at the mid-year meeting of the Executive Board. Dietitians interested in this new service should contact the headquarters office of the Association.



**Pregnant stones,** or "pietre gravide," were once considered by Italian peasants as an indispensable aid to normal childbirth.

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# Current Literature

*Contributed by Janette C. Carlsen and Ethel M. Miller, Dietary Department, Johns Hopkins Hospital; Lorraine G. Weng, University of Chicago Clinics; Marjorie M. McKinley, Women's Educational and Industrial Union, Boston; and Mrs. Margaret Shatswell Price, Winter Park, Florida.*

## AMERICAN JOURNAL OF PUBLIC HEALTH

*Vol. 36, November, 1946*

*An analysis of the effect of fat in the diet on recovery in infectious hepatitis. C. L. Hoagland, D. H. Labby, H. G. Kunkel, and R. E. Shank.—p. 1287.

**Effect of Fat in Diet in Infectious Hepatitis.** A comparison is made of the result of placing thirty-seven patients with acute infectious hepatitis on a diet relatively high in fat and protein with results of a group of thirty-three alternate cases maintained on a diet low in fat and high in protein. The fats were derived chiefly from milk, cream, butter, and eggs. Carbohydrate was permitted in quantities necessary to meet the appetite requirements. In the average case this amounted to approximately 150 gm. of fat and 150 gm. of protein for the first diet and 50 gm. of fat and 150 gm. of protein for the second. The high-fat, high-protein diet appeared to have definite advantages over the low-fat, high-protein diet with respect to relative ease with which an adequate caloric intake could be achieved. Normal values for hepatic function determined by the bromsulfalein retention test were obtained by the twenty-fifth day in the group receiving the high-fat, high-protein diet and by the thirty-third day for the group receiving the low-fat, high-protein diet. It is evident that present concepts regarding the toxicity of fat in the diet should be redefined, and that in planning a diet for the treatment of acute damage to the liver, emphasis should be shifted from a consideration of the total amount of fat in the diet to the type of fat. The fats used were relatively high in unsaturated fatty acids and fatty acids of comparatively short carbon chains as found in milk, cream, and butter.

## BOLETIN—INSTITUTO NACIONAL DE ALIMENTACION (Uruguay)

*Vol. 2, Nos. 10 and 11*

This issue of the *Boletin* of the Uruguayan National Institute of Nutrition is devoted to the luncheon and supper menus served in the dining rooms of the Institute. Varying amounts of calories are supplied, depending on the age and occupation of the persons fed. For infants one to three years of age, 1100 calories; 1800 to 2000 for children four to seven; for laborers, 3200; and for office workers, 2800 to 3000.

There are two sets of menus which are served during alternate weeks. (These menus are changed with the season.) Thus a single meal is repeated only once a month. Directions are given for preparing the dishes to be served, together with the portions allowed. A typical luncheon menu consists of bread, soup, a main dish of meat or other protein, a salad or vegetable, and a fruit dessert. For children, the main dish is omitted in the evening meal, and a milk dessert is given.

## THE CANADIAN MEDICAL ASSOCIATION JOURNAL

*Vol. 55, November, 1946*

*Ascorbic acid metabolism after trauma in man. W. A. Amdreae and J. S. L. Browne.—p. 425.

*Observations on the sprue syndrome. S. J. Shane and V. F. Deyke.—p. 448.

*The management of emergencies in diabetes mellitus. W. W. Simpson.—p. 484.

*The physiological considerations of the etiology and treatment of obesity. H. I. Cramer.—p. 505.

**Ascorbic Acid Metabolism after Trauma.** This study deals with the ascorbic acid metabolism in patients of average nutrition before hospitalization. The dietary intake of the patients was rigorously controlled throughout the metabolic studies. Three normal controls, fourteen cases of fractures, and seven cases of burns were studied. The excretion of ascorbic acid was very low in the fracture and burn cases. Daily ascorbic acid intake was maintained at a high and constant level throughout the metabolic studies by supplementation with crystalline ascorbic acid. On such a regimen the patient's ascorbic acid status changed from a state of depletion as caused by the injury into a state of saturation which could be recognized by a rise in the blood ascorbic acid and by an abrupt decline in ascorbic acid retention. The length of time before saturation is reached depends primarily upon the ascorbic acid dose and to a lesser extent upon the degree of injury. Most of the patients received 500 to 700 mg. ascorbic acid during and about six days following damage before saturation was reached. There is, however, no indication from these studies that the high ascorbic acid intake affected clinical progress of the patients.

**Sprue Syndrome.** Sprue is a disease characterized by steatorrhea, wasting, and anemia. The etiological factors should be recognized as falling in two groups: (a) deficiency of "extrinsic" and "intrinsic" factors as in pernicious anemia, and (b) mechanical factors preventing absorption from the small bowel. The treatment is three fold: (a) Since fat cannot be absorbed, a high-protein, high-carbohydrate diet is indicated. In long standing cases when the small bowel has lost its capacity for absorption, an initial period of parenteral therapy may be necessary. (b) Liver therapy is important in supplying the underlying deficiency which is believed responsible for both gastrointestinal and hematological manifestations. (c) Vitamins A, D, and K, the fat soluble vitamins, must be supplied parenterally.

**Management of Emergencies in Diabetes Mellitus.** This article discusses the management of diabetes in infections, in cardiovascular disease, in pulmonary tuberculosis, in hyperthyroidism, and during pregnancy, as well as in diabetic acidosis and coma.

**Etiology and Treatment of Obesity.** This paper deals with energy metabolism, specific dynamic action of food,

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and water metabolism, as affected in the obese. Endocrine obesity including thyroid, pituitary, and hypothalamus are outlined. The treatments of obesity discussed include diets, exercise, physiotherapy, thyroid, diuretics, and two drugs—dinitrophenol and benzedrine. Advantages and disadvantages for each treatmant are given.

## LA FARMACIA CHILENA

*Vol. 20, January, 1946*

*Conditions of nutritional deficiency and alcoholism. R. M. Tirado.—p. 21.

**Alcoholism.** Thirty alcoholics between the ages of nineteen and seventy were studied. Twelve were vagrants, three having been picked up in the street in a state of exhaustion. Most of the subjects, drinking to excess, ate very little. Various symptoms of avitaminosis were present in all cases. Twenty-five showed cutaneous disorders, four corresponding to pellagra. Sexual disturbances appeared in nearly all the subjects. Psychological disorders, mainly apathy, were found in twenty-two. All but one were extremely thin. There was localized edema in six, general edema in three. Intestinal tone was disturbed. Basal metabolism was lowered in six. Extensive laboratory tests were made and dietetic treatment instituted. The treatment, including vitamins and drugs, had the following results: symptoms of avitaminosis disappeared, skin and psychological condition became normal, weight increased. No improvement was found in the sexual disorders, gastric disturbances, the incipient cirrhosis, and the disturbed glucide metabolism. Alcoholism precipitates nutritional deficiency and aggravates it at the same time. Moral and social reintegration of such cases is practically impossible under present social conditions.

## HOSPITALS

*Vol. 20, November, 1946*

*Review of ways to make sure the tray is an asset. M. Gillam.—p. 82.

**The Hospital Tray as an Asset.** This article reviews the points to be considered in establishing a good food service to patients. Suggestions are given for equipment necessary in offering a service to patients which will be highly regarded and enjoyed. Administrative policies which should insure a good food service are discussed.

## THE JOURNAL OF BIOLOGICAL CHEMISTRY

*Vol. 166, November, 1946*

*Structural specificity of tyrosine in relation to the metabolic action of ascorbic acid. D. H. Basinski and R. R. Sealock.—p. 7.

*Adrenalin in scurvy. S. Banerjee and N. C. Ghosh.—p. 25.

*The distribution of niacinamide and niacin in natural materials. W. A. Krehl, J. de la Huerga, C. A. Elvehjem, and E. B. Hart.—p. 53.

*Colorimetric determination of methionine in proteins and foods. M. J. Horn, D. B. Jones, and A. E. Blum.—p. 313.

*The amino acids of human sweat. S. W. Hier, T. Cornbleet, and O. Bergeim.—p. 327.

**Tyrosine Metabolism.** A series of phenylalanine and tyrosine derivatives has been fed to scorbutic guinea pigs with and without ascorbic acid supplementation. The compounds used were *d*-tyrosine, *d*-phenylalanine, N-acetyl-*l*-phenylalanine, N-acetyl-*l*-tyrosine, diacetyl-*l*-tyrosine, *l*-*p*-methoxyphenylalanine, *dl*-phenylaminobutyric acid, and *l*-S-benzylcysteine. Each represents a specific modification of the original amino acid structure. The values reported for daily urinary excretion of keto acid and phenolic values for each compound have exhibited no correlation with the state of ascorbic acid nutrition. With this method of study it then may be concluded that each is metabolized by the guinea pig independently of ascorbic acid. Added emphasis has thus been given to the previously recorded finding that *l*-phenylalanine, phenylpyruvic acid, and *l*-tyrosine are the compounds exhibiting an ascorbic acid-dependent metabolism.

**Adrenalin in Scurvy.** The effect of scurvy on the adrenalin content of the adrenals of guinea pigs was studied by a paired feeding technique. There was significant increase in the size and also in the adrenalin content of the adrenals of scorbutic guinea pigs. The glucose tolerance tests were performed on scorbutic guinea pigs with demedullated adrenals, on demedullated guinea pigs receiving ascorbic acid, and on guinea pigs with intact adrenals receiving ascorbic acid. The demedullated scorbutic guinea pigs gave a diabetic type of glucose tolerance curve, whereas the others showed a normal tolerance of glucose. Neither adrenalin nor inanition was responsible for the lowered glucose tolerance observed in scurvy.

**Niacinamide and Niacin.** The conditions for hydrolyzing nicotinamide to nicotinic acid and its measurement by *Leuconostoc mesenteroides* have been evaluated. The use of 1 N HCl for hydrolysis proved to be most satisfactory. Selected samples of plant and animal materials were analyzed for nicotinamide by the use of differential assay with *Leuconostoc mesenteroides*, and it was found that animal tissues contain nearly all of the total niacin activity as niacinamide, while plant tissues contain much less and a more variable amount of the total activity as niacinamide.

**Methionine in Proteins.** A colorimetric method is described for the quantitive determination of methionine in isolated proteins and foods. The method is applicable to acid hydrolysates and papain digests of proteins and foods. The methionine contents found for some thirty proteins and foods determined chemically on both acid hydrolysates and papain digests are in close agreement. They also agree with values found for the same proteins by a microbiological method.

**Amino Acids of Sweat.** The microbiological determination of ten free amino acids in normal sweat is reported. It is found that marked increases in the free amino acid content of the plasma due to ingestion of large amounts of single amino acids are without effect on the amino acid content of the sweat. Similarly, food ingestion does not appear to have any effect. The arginine and histidine content particularly, and the threonine and tyrosine content of sweat to a lesser extent, is higher in sweat than in blood plasma, while the other amino acids are present in about the same amounts. These observations indicate that the amino acids do not appear in sweat merely as a result of filtration from the blood plasma. The loss of amino acids in the sweat does not appear to be of much importance in the economy of amino acids by the body.

## THE JOURNAL OF NUTRITION

*Vol. 32, November, 1936*

*Evaluation of proteins by the nitrogen balance method. W. C. Risser.—p. 485.

*Intravenous utilization of partial acid hydrolysates of proteins. W. C. Risser, J. R. Schenck, and D. V. Frost.—p. 499.

*Protein deprivation as a cause of vascularization of the cornea in the rat. W. K. Hall, V. P. Sydenstricker, C. W. Hock, and L. L. Bowles.—p. 509.

*The growth and maintenance utilization of dietary protein. R. H. Barnes, M. J. Bates, and J. E. Maack.—p. 535.

*Observations on pellagra in American prisoners of war in the Philippines. C. F. Lewis and M. M. Musselman.—p. 549.

*Photosensitized oxidation of ascorbic acid in urine and blood serum. M. L. Dodds, F. L. MacLeod, and J. S. Carr.—p. 559.

*The influence of riboflavin consumption on its concentration in hens' eggs. S. H. Jackson, T. G. H. Drake, S. J. Slinger, E. V. Evans, and R. Pocock.—p. 567.

**Evaluation of Proteins by the Nitrogen Balance Method.** Female dogs in good nutritional condition were placed on a diet supplying 75 calories/kg./day and 100 mg. of crude

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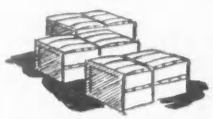

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fibrin nitrogen/kg./day, until a state of positive nitrogen balance was maintained indefinitely. This period of low nitrogen feeding served to deplete the animal's protein stores to a minimum. Animals prepared in this manner were used for determining the minimum protein nitrogen (MPN) values of proteins or amino acid mixtures. The proteins studied were SMA vitamin-free casein, crude blood fibrin, pharmaceutical grade fibrin, and lactalbumin. The MPN values of casein, crude fibrin, and pharmaceutical grade fibrin were found to be, respectively, 140–160, 70 and 70, and 80–100 mg. N/kg./day. Fortification of casein with cysteine reduced the MPN value to 80–100 mg. N/kg./day. When both cysteine and methionine were added to casein in sufficient amounts, the MPN value fell to 60–70 mg. N/kg./day. The MPN value for lactalbumin was not determined, but it maintained nitrogen balance when given at the rate of 100 mg. of lactalbumin nitrogen/kg./day.

**Partial Hydrolysates Intravenously.** The minimum amount of complete acid hydrolysate of casein fortified with tryptophane and cysteine required to maintain nitrogen balance in intravenous injection in female dogs was determined. The same was done for a partial hydrolysate of casein similarly fortified. Although 83 to 75 per cent of the amino acids of the partial hydrolysate were bound in peptides, this partial hydrolysate was just as effective in maintaining nitrogen balance as was the complete hydrolysate given at the minimum level (120 mg. N/kg./day), which would maintain nitrogen balance. This provides excellent evidence that the peptides of the partial acid hydrolysate are utilized for anabolic processes. Partial and complete casein hydrolysates and partial fibrin hydrolysates were fortified in different ways with tryptophane, cysteine, and methionine, and the effectiveness was studied of each fortified hydrolysate in maintaining nitrogen balance after intravenous administration.

**Rat Corneas in Protein Deprivation.** Rats fifty days of age or older, when placed on a diet devoid of protein, develop extreme corneal vascularization. By the time the vascularization appears, blood hemoglobin and total plasma protein show a slight decrease in level. When the rats are returned to an adequate diet, the vessels regress.

**Biological Value of Proteins.** A study has been made of the growth and maintenance utilization of four crude protein sources covering a wide range of nutritive qualities. When the level of protein intake is increased, there is a decline in the fraction of absorbed protein that is utilized for maintenance. At the same time the fraction utilized for growth rises to a maximum and then declines. The net results of these changes is a fall in the biological value. The relative participation of growth and maintenance in making up the biological value varies markedly depending upon the quantity and the nutritive quality of protein that is ingested. Since the requirements for growth and maintenance are different, the conclusion is drawn that these two factors should be measured independently and not in combination.

**Pellagra in War Prisoners.** Pellagra was observed in American troops living for three years on a deficient diet in Japanese prison camps in the Philippine Islands. Men developed pellagra while on a diet low in calories, high in carbohydrates, and lacking in animal proteins, fresh fruits, and vegetables. Pellagra appeared in epidemic proportions after six months on a deficient diet. The signs and symptoms that were observed are described. The clear separation of certain dermal and neurological lesions according to specific vitamin lack was difficult. Processed foods, a crude yeast culture, and pure vitamin preparations were effective in controlling pellagra. Pure vitamin preparations were more effective when the diet was more adequate. The daily multivitamins utilized during 1944 reduced the incidence of the severe pellagra seen in 1942 and 1943.

**Photooxidation of Ascorbic Acid.** The photosensitized oxidation of reduced ascorbic acid in urine preserved at *p*H 2 to 3 has been shown to take place. The ascorbic acid is present in the urine after oxidation as dehydroascorbic acid. The reaction depends upon the presence of dissolved oxygen. The reaction is accelerated by increasing amounts of riboflavin. A loss of reduced ascorbic acid occurs in blood serum exposed to light.

**Riboflavin in Eggs.** Barred Plymouth Rock pullets were divided into groups and supplied with rations containing different concentrations of riboflavin. The riboflavin in the feed and the eggs was determined by assay of representative samples, and the total riboflavin consumed and that recovered in the eggs was calculated. A maximum recovery in the eggs of about 24.2 per cent was found at a dietary level of 1300 mcg. per pound of feed for birds in pens. When they were kept in batteries, the recovery increased 29.6 per cent at 1600 mcg. per pound of feed. About 40 per cent of the extra riboflavin required to raise the concentration in the feed from 1000 to 1350 mcg. per pound was recovered in the eggs. There was some variation in the concentration of riboflavin in the eggs from various breeds and varieties on the same ration. There was also variation between individual hens on the same ration.

## THE LANCET

*Vol. 2, November 9, 1946*

*Salt deficiency in sprue. D. A. K. Black.—p. 671.

*Vol. 2, November 30, 1946*

*Haemopoietic response to folic acid in pernicious anaemia. R. J. Harrison and J. C. White.—p. 787.

**Salt Deficiency in Sprue.** Between 5 and 10 per cent of patients with sprue acquired on military service have had a low blood pressure, asthenia, and signs of peripheral circulatory failure. Ten such patients had low serum-sodium and serum-chloride levels, and in some cases a plasma volume which was low in relation to body weight. Of these abnormalities, the low serum-sodium level was the most pronounced. A balance experiment on a typica patient showed abnormal loss of sodium, and to a less extentl of chloride, in the feces; in the urine, sodium was rigidly conserved, while chloride was excreted, though in amounts less than normal. When the patient was put on a high intake of salt, sodium and chloride were both retained, and the serum-sodium and serum-chloride rose to normal levels; the blood pressure rose, and the clinical signs of dehydration disappeared, though the abnormal loss of fat in the stools was not affected. It is considered that such patients show the clinical and biochemical pattern of salt deficiency, modified by some degree of acidosis, owing to the preponderant loss of sodium over chloride in the stools. Loss of electrolyte in copious watery stools is thought to be the main cause of the salt deficiency, but diminished intake of salt is also a factor. The results reported do not suggest adrenal insufficiency, for the serum-potassium was not increased, and the conservation of base by the kidneys was adequate. Treatment by increasing the salt intake to 15 gm. a day corrects the dehydration in a few days, and intravenous saline had to be given in one patient only.

**Hemopoietic Response to Folic Acid in Pernicious Anemia.** The response of an advanced case of pernicious anemia to folic acid given by mouth is described. Therapy led to a return to normal hemopoiesis, as shown by the changes in sternal marrow and peripheral blood. Repeated doses of folic acid were necessary to maintain normal hemopoiesis.

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*Tune in the Sealtest Village Store, starring Jack Haley, Thursday Evenings, NBC*

## NEW YORK STATE JOURNAL OF MEDICINE

*Vol. 46, November 1, 1946*

*The management of ambulatory peptic ulcer patients with protein hydrolysates. W. F. Ruggiero, F. CoTui, and A. A. Bianco.—p. 2395.

*Vol. 46, November 15, 1946*

*The dietary treatment of Laënnec's cirrhosis. A. R. Patek.—p. 2519.

**Treatment of Peptic Ulcer Patients with Protein Hydrolysates.** One hundred and thirty-four ambulatory patients with peptic ulcer were treated with protein hydrolysates. From previous experience it was decided to give these patients the protein hydrolysate in amounts sufficient to supply 0.6 gm. of nitrogen per kg. body weight, and to give enough hydrolysate and dextrimaltose No. 2 so as to supply between 49–50 calories per kg. body weight. Two patients developed massive gastrointestinal hemorrhage while under treatment and had to be hospitalized. Two others perforated during the first week of the treatment, so it is apparent that the usual complications of peptic ulcer are not completely prevented by the use of protein hydrolysates. Of the cases treated, sixteen were failures. Those cases who did well were not necessarily cured, but clinically the symptoms or signs referable to peptic ulcer disappeared.

**The Dietary Treatment of Laënnec's Cirrhosis.** One hundred and fifty cases of cirrhosis of the liver were treated by diet rich in protein and ample in carbohydrate and fat. It consisted chiefly of meat, milk, eggs, fruit, and green vegetables. Meat was served twice daily, milk five times daily—three times with meals and twice with 25 gm. of powdered brewers' yeast. On analysis, the diet contains: carbohydrates, 365; proteins, 140; fats, 170. The caloric value is about 3500. Brewers' yeast was fed in graded doses, increasing until the patient receives 25 gm. twice daily. In patients with ascites, fluids were allowed up to 2000 cc. daily, and salt was moderately restricted. (Extra salt was not added either in the preparation of food or on the tray.) Although the results of treatment for liver failure were far from satisfactory, much can be done for these patients whose outlook previously was held to be hopeless. Of 125 cases with failure, 51 showed signs of clinical improvement. In milder cases of cirrhosis, the response to therapy was excellent.

## PUBLIC HEALTH REPORTS

*Vol. 61, November 22, 1946*

*The effect of topically applied sodium fluoride on dental caries experience. III. Report of findings for the third study year. J. W. Knutson and W. D. Armstrong.—p. 1683.

**Effect of Sodium Fluoride on Dental Caries.** During the three-year period ending May, 1945, the number of permanent teeth initially attacked by caries was 36.7 per cent less in fluoride-treated than in untreated teeth. This difference is somewhat smaller than that observed for the first year (39.8 per cent) and for the two-year period ending May, 1944 (41.4 per cent). During the third study year, or the year ending May, 1945, initial caries attack was 22.2 per cent less in fluoride-treated than in untreated permanent teeth. This yearly difference is substantially less than that observed for the second year (46.6 per cent), and for the first study year, 39.8 per cent. Among permanent teeth which were carious at the beginning of the study in 1942, the number of additional surfaces which became carious during the three-year period ending May, 1945, was 23.9 per cent less in treated than in untreated carious teeth.

## REVISTA DE MEDICINA DO RIO GRANDE DO SUL (Brazil)

*Vol. 2, March-April, 1946*

*Anorexia. A. Hutz.—p. 218.

**Anorexia.** The meaning of and the relation between hunger and appetite are discussed. Anorexia is defined as lack of appetite and is one of the most frequent symptoms in dyspepsia and other pathological conditions. Prolonged anorexia may result in cachexia and marasmus. Anorexias may be classed as total and general or partial and selective, and may be temporary or permanent. Selective anorexia may assist in diagnoses. For example, a lack of appetite for fats may mean neoplasia of the pancreas. Sudden anorexia is associated with nervous dyspepsia, visceral prolapsis, certain forms of gastritis and dyspepsia with spasm of the pylorus. A list is given of thirty pathological conditions under which anorexia may occur. Discussed in detail are conditions in which anorexia is a symptom of primary importance. These are cancer of the stomach, thiamine deficiency, Simmonds disease, nervous anorexia, hypothyroidism, hyposuprarenalism, hypergonadism, pulmonary tuberculosis, uremia, infantile anorexia, anorexia of puberty, allergy, and visceral prolapsis. Pseudo-anorexia is discussed. In this case, errors in observation may be involved in diagnosing, or there may be mechanical difficulties such as adenoids, and dentition. A third condition is bradyphagia (slowness in eating) which is likely to be a result of social training rather than a matter of appetite. Dysphagia may also be confused with anorexia.

## SCIENCE

*Vol. 104, November 29, 1946*

*Calorie intake and industrial output. H. A. Kraut and E. A. Muller.—p. 495.

**Calorie Intake and Industrial Output.** Results are presented which prove that rationing of food also means rationing of industrial production of a country. Control of production is diverted from management to those responsible for food administration, who often cannot see the consequences of their decisions. Under existing conditions, the job of one man often has to be done by two or three men at a higher total wage cost. There is a lack of knowledge about the work a man is able to do with the calories available. Engineers appointed to fix the times for piece work and job performance have calculated these times and the resulting flow of the manufacturing process under the assumption of unlimited food supply. Rationing makes these calculations as worthless as efficiency tables of an airplane motor with insufficient fuel.

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## AMERICAN RESTAURANT MAGAZINE

*Vol. 30, October, 1946*

Are you getting the breakfast business?—p. 10.
*Why restaurants fail.—p. 27.
Layout pattern No. 18. C. Wagner.—p. 50.
*Convenient whipped cream dispenser now available.—p. 86
*World fats and oils output retarded.—p. 88.
What's the answer on electronics? J. C. Sharp.—p. 92
*Leitner to build packaged restaurant units.—p. 114.
Ameoin shows new juice fountains.—p. 116.
*Government moves to save fruit.—p. 116.
*Sanitation school in Florida.—p. 124.

**Why Restaurants Fail.** Due to lack of knowledge and enticed by the false hope of quick, easy profits, 50 per cent of all new restaurants will fail within a year and a much higher percentage will lose out within three years. Almost unanimously, successful restaurant operators urge pro-

BY Mary I. Barber OF KELLOGG'S

# HOT COFFEE... FRESH ROLLS... AND CRISP RICE KRISPIES!

*Director of Kellogg's Home Economics Department Battle Creek, Michigan*

YOU dietitians know only too well how finicky most people are when they are confined to a hospital bed. All their normal daily interests have been taken away. Their attention is necessarily concentrated on their physical condition and they attach so much importance to little comforts!

A hospital in which I was a patient will always stand out in my memory for the superb coffee served. It was delicious and it was *hot*. It is equally important that rolls and ready-to-eat cereals be fresh and *crisp*.

### CRISPNESS YOU CAN HEAR!

Rice Krispies, Kellogg's brand of oven-popped rice, are so very crisp that you can actually hear them crackle and pop when you add milk. Our advertising people have dramatized this fact by creating three little characters, "Snap!", "Crackle!", and "Pop!" If you attended the ADA convention last fall, you met them "in person" at our booth.

### NUTRITION YOU CAN COUNT ON!

The wonderful thing about Rice Krispies — and the other Kellogg ready-to-eat cereals—is that you enjoy their many advantages with all the benefits of good nutrition.

Ounce for ounce, Kellogg ready-to-eat cereals have the same *fuel value* as hot cereal. They have good protective values, too, because all the Kellogg cereals either are made from whole grain or are restored to whole-grain values of thiamine, niacin, and iron.

The food values which appear on the Kellogg cartons are present in the cereals after they have been thoroughly and carefully cooked, restored, and packaged. You, therefore, are sure of getting exactly the nutritive values promised you by Kellogg's.

***Mary I. Barber,*** DIRECTOR
HOME ECONOMICS DEPARTMENT

*At the 1946 ADA convention, youngsters dressed as "Snap!", "Crackle!", and "Pop!" pinned tiny silver cereal spoons on visitors to the Kellogg booth. Over 500 spoons were given away!*

Kellogg's

KELLOGG'S CORN FLAKES • RICE KRISPIES • PEP
RAISIN BRAN FLAKES • 40% BRAN FLAKES
ALL-BRAN • SHREDDED WHEAT • KRUMBLES

spective operators to work in successful restaurants for long enough periods to acquire knowledge concerning the details of good restaurant management. More failures occur in the restaurant industry than in other fields. Statistics show that the reasons for bankruptcies differ in the opinions of the owners and the creditors. In this, its third annual Opinion Survey, the *American Restaurant Magazine* presents the suggestions and opinions of the nation's leading restaurant owners and operators who lend their knowledge and experience to help decrease the failures in the restaurant field.

**Whipped Cream Dispenser.** Now available is a dispenser which makes 4 pt. of whipped cream from 1 pt. of coffee cream. Use of a special bottled gas permits the instant whipping of the amount needed. Since the cream keeps sweet and clean under the gas pressure in the dispenser, it minimizes waste, cost, and spoilage.

**Fats and Oils.** It may take three years or more to reach the 1935–39 world output of fats and oils. Present aids to the supply are the expansion of sunflower seed production in Argentina and a high output of lard and soybeans in the United States.

**Packaged Restaurant Units.** Plans are underway to produce commercially complete restaurant units including back bar assembly, counter, and stools accommodating five to twenty-one people. These units are of uniform dimensions so that new sections may be added as desired.

**Government Moves to Save Fruit.** The government is permitting wet corn processors to use more corn or grain sorghums provided they are processed into glucose or dextrose for use in the manufacture of certain types of jams and jellies. This will make available more low priced fruit spreads.

**Sanitation School.** The Chamber of Commerce of Ocala, Florida, sponsored a successful food handlers' school attended by approximately three hundred restaurant employees and managers. The two-day course consisted of instruction by lectures and films devoted to elementary sanitation in handling food and personal hygiene. Many of the Ocala food establishments closed for two hours each day during the course to enable all employees to attend. Special certificates were presented to individuals and operators who attended the meetings.

## BAKERS' HELPER

*Vol. 86, October 5, 1946*

SBA unanimously endorses 1/20th of 1% national public relations plan. C. C. Swearingen.—p. 48.
*Forecast higher prices for eggs. L. Sullivan.—p. 52.
*Foil bread wrappers.—p. 53.
*Outlook for ingredients and supplies.—p. 64.

*Vol. 86, October 19, 1946*

*Hygiene in bakery sanitation. Dr. E. L. Holmes.—p. 42.
Controlling stale returns on the routes. C. C. Swearingen.—p. 44.
*Soy flour in the baker's products. W. E. Broeg.—p. 48.
Quality fruit cake has many selling points. H. F. Schudlich.—p. 70.

*Vol. 86, November 2, 1946*

*Revoke war food order no. 1.—p. 30.
All bakery products removed from price control.—p. 30.
*A new sugar substitute.—p. 47.
*"Plans for progress" in bakery equipment for the retail baker. C. W. Steinhauer, Jr.—p. 68.
Bakers watch weather charts.—p. 74.
*Hygiene in bakery sanitation. E. L. Holmes.—p. 81.
Truman topless pie. W. E. Broeg.—p. 88.

*Vol. 86, November 16, 1946*

Answers to your technical problems. W. E. Broeg and R. Thelen.—p. 29.
*Sugar price fixed for '47. L. Sullivan.—p. 45.
Another sugar substitute. L. Sullivan.—p. 45.
*The American pie. M. Spoth.—p. 78.

**Higher Prices for Eggs.** The 1947 report of the Department of Agriculture forecasts higher prices for eggs due to advancing feed costs and higher taxes in most localities. An estimated rise above the 1946 price will result in 35 cents a dozen on the farm against 29 cents in 1946. U. S. egg production next year is estimated at 6 to 9 per cent below 1946. The 1946 consumption is computed at 370 eggs per capita. Export demand is falling sharply as Europe and Australia re-establish their normal prewar flocks.

**Foil Bread Wrappers.** The original idea behind the use of foil for bread wrappers was purely eye appeal for it has merchandising appeal and suggests high quality. However, tests show that a foil wrap will keep bread just as fresh as other types of wraps; that it can be handled satisfactorily on existing bread wrapping machinery; and that it will stand up under the handling through distribution. The cost is not prohibitive, and the weather makes no difference in the product. It is believed to retard bread molds.

**Outlook for Ingredients and Supplies.** The Department of Agriculture has removed import controls of coconuts in the shell and on shredded and desiccated coconut meat where no cane or beet sugar has been used in its preparation. Since the 1947 outlook for fats and oils remains bleak, relief export shipments were halted January 1. Sugar shipments in rail cars from cane refiners and beet processors on the coastal regions appear easier than shipments from inland suppliers. With so many ships assigned to the sugar trade now in U. S. harbors, which must unload here and return with additional sugar cargoes, and with the general scarcity of raw sugar, further shut downs and/or slow downs are expected at sugar refineries before increased 1947 sugar supplies are available.

**Hygiene in Bakery Sanitation.** The teaching of good personal hygiene practices to all bakery employees is of vital importance. Personal hygiene and the proper cleaning and sanitation of equipment helps to prevent the spread of disease by food producing establishments. The five specific objectives of personal cleanliness are: frequent and proper hand washing, personal good health, keep hands and articles away from mouth and nose, ears and eyes, avoidance of common or unclean eating and drinking utensils or toilet articles, avoidance of exposure to the spray from mouth and nose of others. Emphasis is also placed on the importance of having employees wear clean uniforms.

**Soy Flour in the Baker's Products.** The natural ingredients in soy flour have been found to assist in the retention of the "fresh" flavor of doughs. Also it improves the nutritional properties, uniformity, richness of appearance, and develops desirable flavor and odor. Recipes using soy flour for 100 lb. flour batches of bread are given. The amount of soy flour to use will depend upon the results desired. Each 5 lb. of soy flour will require 10 lb. of additional water. Therefore, up to 20 per cent of either high- or low-fat soy flour may be used by considerable increasing of moisture, adjusting the leavening, shortening, and similar ingredients. Otherwise, reduce the wheat flour used in proportion to the soy flour. High-fat soy flour will absorb approximately 120 per cent water and low-fat soy flour 165 per cent water as compared with 60 per cent absorption for white flour. Include the soy flour by blending with sifted wheat flour or by mixing with the moisture. Follow the usual procedure of mixing to produce a medium dough. The temperature and baking time varies depending upon the results desired from a finished dough.

**Revoke War Food Order No. 1.** W.F.O. No. 1, in effect since January, 1943, was revoked October 25, 1946. This last revocation removed the following requirements: (a) restrictions on the varieties of bread and rolls a baker may produce; (b) restrictions on consignment selling; (c) enrichment of white bread and rolls; (d) the 10 per cent

# COMPARE THIS INFANT CEREAL WITH ANY OTHER

**For ingredients**... Clapp's Instant Cereal is made from the following ingredients: whole wheat meal, corn meal, wheat germ, malt, non-fat dry milk solids, calcium phosphate, dried brewers' yeast, salt and iron ammonium citrate.

**For nutritional values**... While the quantity of Clapp's Instant Cereal used may vary considerably for the individual, ½-oz. and 1-oz. quantities may be considered average daily amounts for the infant and young child respectively. These amounts furnish the following percentages of the minimum daily requirements:

**For infants,** vitamin $B_1$—120%, vitamin $B_2$—20%.
**For young children,** vitamin $B_1$—60%, Iron—113%, Calcium—32%, Phosphorus—22%.

Because the essential Calcium, Phosphorus, and Iron requirements of infants, and the vitamin $B_2$ requirements of children vary so widely, it is impracticable to establish minimum daily requirements.

**Typical Analysis of Clapp's Instant Cereal**

Carbohydrate 73.1%
Protein (Nx6.25) 15.0%
Fat (ether extract) .8%
Ash (total minerals) 3.8%
Crude Fiber 1.6%
Calcium (Ca) 800 mg. per 100 gms.
Phosphorus (P) 580 mg. per 100 gms.
Iron (Fe) 30 mg. per 100 gms.
Copper (Cu) 2 mg. per 100 gms.
Thiamine ($B_1$) 1.0 mg. per 100 gms.
Riboflavin ($B_2$) 0.3 mg. per 100 gms.
Moisture 5.7%
Calories per ounce 102.

**For taste**... Hundreds of cases are on record in which infants who refused other cereals accepted Clapp's Baby Cereals readily. Reports are constantly received from mothers of marked improvement in their babies' appetite for cereal when Clapp's was substituted for brands formerly used.

**For texture**... The fine, but definite, texture of Clapp's Baby Cereals is readily accepted by babies. This texture, marking a distinct advance over a liquid diet, prepares the infant for later progress to solid food.

The Council on Foods of the A.M.A. suggests that infants' cereals may well be selected upon the basis of furnishing vitamin $B_1$ and Iron.
Both Clapp's Instant Cereal and Clapp's Instant Oatmeal are excellent sources of these two food elements.

## CLAPP'S BABY CEREALS

PRODUCTS OF AMERICAN HOME FOODS

***For generous professional samples—mail this coupon***

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**CLAPP'S BABY FOOD DIVISION, American Home Foods, Inc.**
**P. O. Box 164, Canal Street Station, New York 13, N. Y.**

Please send me a supply of professional samples of Clapp's Instant Cereal and Clapp's Instant Oatmeal.

**Name**_____

**Address**_____

**City**_____ **State**_____

mandatory reduction in the weight of all white bread; (e) prohibition against gifts of bakery products; (f) restrictions of bread formulas.

**A New Sugar Substitute.** A new sugar sirup made principally from wheat is now available in the form of a liquid dextrose. No cost figures on the new product are available as yet.

**"Plans for Progress" in Bakery Equipment.** An efficient working layout is necessary to obtain full benefits from your equipment. The trend in equipment is toward greater mechanization. Eventually there will be machines to do almost all of the present hand operations. Ovens are now of the more practical, revolving tray type which permit greater uniformity of products and elimination of the need for a long handled peel. Retarded dough boxes, of both the cabinet and walk-in models, allow dough to be made during slack periods and held until needed. Larger mixers with capacities up to 120 and 175 qt. are in greater demand. There will be a choice of different ratios between the revolutions of the head and the beater. Sanitation and safety are the new watchwords in all designs. Similar to the pie crust rolling machine is the dough sheeter for coffee cakes, sweet goods, and other rolling pin items which need to be of uniform thickness. Bread molders are an advantage when making 300 or more loaves of bread a day. Automatic pan washers now wash and sterilize pans in a fast, simple operation, thus improving sanitation. Manually or automatically controlled, well designed, efficient proof boxes or cabinets are available. Smaller, movable racks are especially designed to meet needs, save much time, energy, and floor space. Other pieces of equipment are bread slicers, wrapping machines, cookie droppers, cake depositors, doughnut machines, and steam jacketed kettles.

**Hygiene in Bakery Sanitation.** Design of bakery equipment must be improved to allow for better cleaning and sanitation of the equipment. Any accumulation of dough will likely cause bacteriological fermentation with off-flavors and odors. Thus the quality of subsequent batches of products so manufactured is materially lessened and insect infestation is likely. Adequate clean-up is a necessity in three aspects—physical, chemical, and bacteriological—if complete freedom from any visible foreign matter, undesirable chemicals, and bacteria or live organisms of any kind is to be achieved. Detergents or cleansing agents are necessary to achieve physical cleanliness. Their efficiency is increased if heat and pressure are also used. Three types of sanitizing or sterilizing agents are recommended: (a) those providing active chlorine, hypochlorites; (b) chloramine compounds; (c) surface-acting compounds. However, it must be realized that much of the inefficiency of clean-up can be blamed on poor clean-up personnel under poor supervision and with improper training. It is, therefore, important to develop a sense of pride and dignity for the clean-up operation to produce a satisfactory job. Also, it is necessary for one person to bear the responsibility and see that the sanitation program is actively carried out.

**Sugar Price Fixed for 1947.** A guaranteed sugar price of $5.28½ per cwt. has been announced to the U. S. possessions of Hawaii, Puerto Rico, and the Virgin Islands for the 1947 crop. This is an increase in the price over the $4.49 to $4.54 paid for the 1946 harvest.

**The American Pie.** In selecting fruit for pies, bakers should look for the fruit which has been preserved to their greatest advantage. It is a serious mistake to feature pies, the fruit of which cannot at present be preserved to make it equal to the fresh. In addition to the selection of high quality fruit, the use of proper utensils in preparing, cooking, cooling, and storing the fruit is important. Stainless steel is suggested as best for cooking, and heavy enamel ware for cooling and storing. However, danger is present in the enamel due to the possibility of chipping. The cooking utensils must be thoroughly scoured just before use to prevent food poisoning. Rapid cooling of fruit after cooking is necessary and can be done by use of a cooling table. This table may be just a large enamel pan with a 3- or 4-in. rim which can be placed in the ice box, or a low, double-jacketed, water-cooled table onto which fruit can be dumped directly from the steam cooker. Never should any cooked, left-over fruit be mixed with a fresh batch. All storage containers should be scrupulously clean. Only the amount of fruit actually needed for immediate use should be prepared at one time. A deeper, broader rim pie plate is to be preferred as the fruit will remain hotter and is not as likely to boil out during baking.

## BETTER FOOD

*Vol. 52, October, 1946*


*Today's food facts.—p. 6.
Calories—today and yesterday. H. H. Darby.—p. 22.
*The sugar outlook.—p. 24.
Prepackaging fruits and vegetables. C. W. Houck.—p. 26.
A few facts hot off the griddle.—p. 28.
Four-in-line gas range.—p. 31.
*Effective teaching. XIII. School is the place to improve food habits. Part II. M. A. Banks.—p. 32.
Merry-go-round for cows.—p. 34.
*Mount Holyoke's efficient culinary system. M. Lind.—p. 38.
*The communal restaurants of Britain. E. A. Dench.—p. 40.
The children's hour.—p. 42.
*The problem of rancidity in foods.—p. 44.
*A glossary of cooking terms. F. deN. Schroeder.—p. 48.


*Vol. 52, November, 1946*

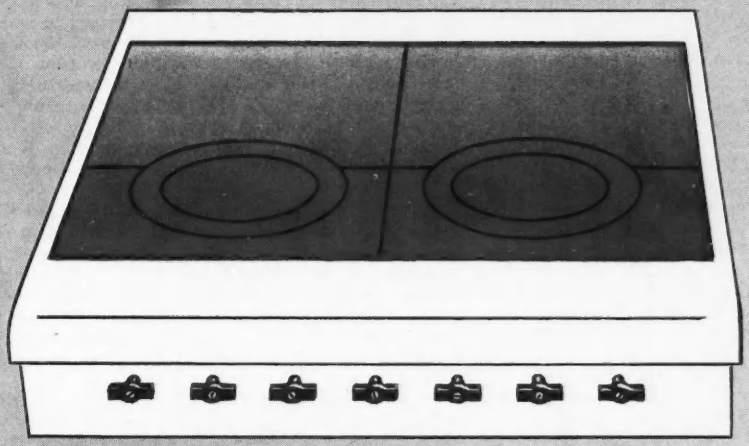

Aluminum refrigerator car.—p. 6.
*Strawberries rich in vitamin C.—p. 6.
*Snow white potato chips. A. R. Patton and W. E. Pyke.—p. 18.
*Browning in foodstuffs. M. L. Anson.—p. 18.
*Dried eggs have a future. T. S. Harding.—p. 24.
How I use my test kitchen. E. Latzke.—p. 26.
*Nitrogen demands of the convalescent and undernourished. H. H. Darby.—p. 28.
*The children's hour.—p. 34.
*Cooking the "waterless" way.—p. 36.
*"Keeping it where it belongs.—p. 40.
*The American Institute School of Baking. M. K. Moore.—p. 42.


**Food Facts.** Studies made at Cornell University have proved that home frozen foods are at present superior to commercially frozen products. . . .The West Indian cherry grown in the temperate zone under abundant sunshine contains as much as 3300 mg. of ascorbic acid per 100 gm. of fruit. This fruit is widely eaten by the natives and since the daily requirement is 75 mg., it appears that an overdosage of ascorbic acid would not prove harmful. . . . Nutrient X, an unidentified food factor, appears to play an important part in the palatability of foods. Rats fed on a diet deficient in Nutrient X showed distinctly inferior growth. When this factor was included, the growth became normal. One way to explain this would be to say that the rats did not find the X-free diet palatable and would not eat enough of it for growth. . . .Freezing does not necessarily kill organisms; rather it halts their growth. Experimenters at the University of Illinois found that enough microorganisms remain in frozen apple juices to cause spoilage after thawing if the juice is held at room temperature for any length of time.

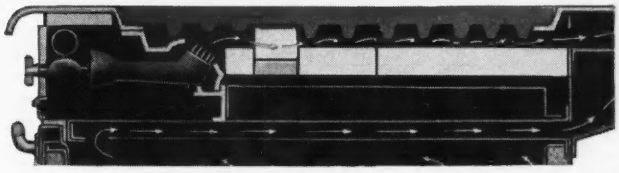
**The Sugar Outlook.** It does not seem that the sugar supply will be adequate in the years 1947–1948. Underproduction, as well as an increase in population without a similar increase in sugar production, contribute to this lack. During the Japanese occupation of the Philippines the natives did everything possible to decrease production. This destruction and political unrest must be overcome

# UNMATCHED

## *Flexibility of Control on the Hot Top is Yours—*



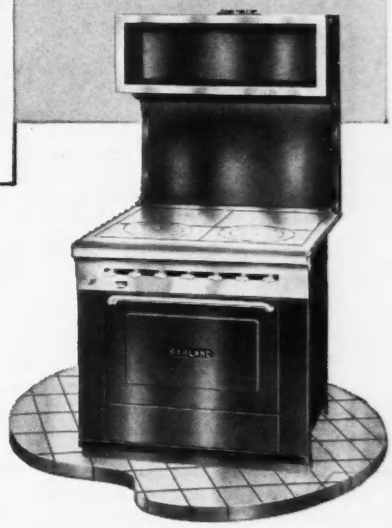
**when You Choose the LEADER**



*Cross Section—Front to Back View*

The Garland All Hot Top Range has the features to deliver *any* heat the chef wants—*where* he wants it—*when* he wants it. Each of the seven burners which heat the Hot Top are individually controlled. By adjustment, the chef can vary the heat on different sections of the Hot Top to exactly suit his needs.

But this is only one way Garland makes it easier to cook more food, *better!* Everywhere throughout the range, there are features, engineered by men who know volume cooking requirements; important refinements which always identify the *leader!* For greatest value, *choose the leader!* See your Garland dealer—or write us for information on any type of equipment you may need.



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# GARLAND

*THE TREND IS TO GAS*

FOR ALL COMMERCIAL COOKING

HEAVY DUTY RANGES • RESTAURANT RANGES • BROILERS • DEEP FAT FRYERS • TOASTERS
ROASTING OVENS • GRIDDLES • ALL TYPES OF COMMERCIAL COOKING EQUIPMENT

**Products of Detroit-Michigan Stove Co., Detroit 31, Michigan**

before large quantities can be produced. Java formerly supplied the Dutch colonies and Holland with a large amount of sugar, but the unrest in Java will decrease production and cause our sources of supply to be tapped to fill the need for sugar in Europe. The sugar crop of Cuba this year will be considerably above average, yet it cannot make up for the shortages in other parts of the world. At one time Mexico produced immense quantities of sugar. It would be wise to foster a return of large sugar acreages in Mexico to increase the available supply and to increase Mexico's purchasing power. France and Germany will be able to supply some beet sugar this year. Beet sugar production in the continental U. S. may, with correct research, constitute a basic minimum that can be obtained no matter what occurs to outside sources. We must look to corn sirups to produce sugars.

**School Is the Place to Improve Food Habits.** This is the second in a series of articles on effective teaching as it concerns the improvement of children's food habits. Two examples are given of portable kitchens that have been obtained to make possible the preparation by the children of one hot dish to supplement the cold lunches brought from home. In many situations the entire meal is organized and prepared by the teachers and the students. The organization and accomplishments of a "cooking club" initiated by third grade children is described. Such school lunch projects afford many satisfying experiences for the children. In addition to the fun of cooking, they learn nutrition, social graces, and ways to apply their knowledge of arithmetic, art, and other elementary subjects.

**Mount Holyoke's Efficient Culinary System.** The contribution of deliciously prepared and attractively served food to the social development of the undergraduates in a residence college is emphasized. The organization of the food service department at Mount Holyoke College is described. Social events involving refreshments are planned by the Dean of Residence, the steward, and the dietitian.

**Britain's Communal Restaurants.** The British Ministry of Food operates some 2000 British restaurants. Before the war Britain was poorly supplied with restaurants, and many have requested that these restaurants be continued.

**Rancidity.** During the twenties and thirties, food technologists found that rancidity was one of the chief enemies of flavor. Rancid flavors develop chiefly in fats and oils, but are not confined to these foods. Disagreeable odors and flavors develop even in foods of low-fat content. Next to spoilage by microorganisms, it is the biggest problem the food manufacturer faces. The term rancidity may be used to describe flavor deterioration caused by chemical changes in fats or in the fatty content of any material. Oxidation rather than hydrolysis is the most common cause of rancidity. The reaction is speeded by higher temperatures, moisture, sunlight, and by certain metals. Flavor deterioration is accompanied by a loss of nutritive values. Ketone rancidity is caused by enzymes produced by certain molds. An unpleasant odor is not always present, but there is a disagreeable flavor. Hydrolytic and ketone rancidity are not found as frequently as oxidative and are more easily combatted. Oxidative reactions leading to rancidity occur spontaneously but may be prevented by excluding oxygen from the product or by introducing an anti-oxidant. Vacuum packing of commercial foods protects them against rancidity. Due to the presence of naturally occurring anti-oxidants, vegetable shortenings are more resistant to oxidation than animal fats. Oxygen exclusion methods, anti-oxidants, and other protective measures are discussed in detail.

**Cooking terms.** "Gumbo" originated from the word *kingombo* which was half soup and half stew, thickened with the mucilaginous pods of okra. This dish was introduced to the South by slaves from Liberia and French and Belgian Congos. "File" (meaning ground) is the dry, powdered leaves of sassafras. It is an essential ingredient in today's Louisiana gumbos. "Appetizer" is from the Latin *peto, petere,* meaning to beg or yearn. It is something to increase the appetite, something that makes one yearn for more food. "Gourmet" comes from the Dutch *grom* and contrary to popular belief originally meant a male serving boy, rather than a discerning lover of fine foods. "Canape" originated from the Latin word *canapeum* which meant a fine netting draped over a Roman patrician's bed to keep away mosquitoes. Gradually, it developed to include the bed itself. Thus a canape is an appetizer that rests on a bed of toast or cracker. "Marinate" is from the Latin *mare,* meaning the sea, and refers to something that is pickled in salt water. We think of it as the action of acetic acid, either in wine or vinegar. "Range" is from the French *ranc,* meaning rank or row. A range is a device which enables the cook to arrange pots and pans in rows over the fire.

**Strawberries Rich in Ascorbic Acid.** Strawberries have an ascorbic acid content more than twice as high as tomatoes and considerably above oranges. This ascorbic acid is not materially reduced by freezing even after six months' storage. The daily recommended allowance could be supplied by ¾ cup of freshly-picked strawberries. Experiments show that the average ascorbic acid content of strawberries was 62 mg. per 100 gm. of fruit, while oranges, grapefruit, and tomatoes rank next.

**Snow White Potato Chips.** By briefly treating raw potato slices with hot water under controlled conditions, potato chips may now be made uniform in color or even white. The objectionable brown color is due to traces of amino acids and reducing sugars which react chemically during frying.

**Browning in Foodstuffs.** Enzymatic and non-enzymatic browning are possible in foodstuffs. The former occurs in bananas and potatoes and may be stopped if the cause, tyrosinase, is destroyed by heat or removed. The second type may be accompanied by bad flavors during processing and storage. This latter browning was an important cause of deterioration during storage of some major Army dehydrated foods. Control of the browning reaction was achieved by drying to low moisture, by addition of sulfite which inhibits the browning reaction, and by the regulation of storage conditions.

**Dried Eggs.** During the period of 1941–1945, 12 per cent of this nation's total egg production was dehydrated. During this period ¾ billion lbs. of dried eggs were shipped under lend-lease; this amount is equal to nearly 3 billion doz. shell eggs. In properly made, airtight containers, dried whole eggs can be held for a relatively long time without refrigeration. If properly processed, packed, stored, and dried, the product makes highly palatable and nutritious foods. Obscure chemical changes are the cause of deterioration. It is important to control acidity during the drying and storing of the eggs, for this may lead to an extension of the life of the product. Freshness may be prolonged by packaging the egg powder in an atmosphere of a neutral gas like carbon dioxide.

**Nitrogen Demands of the Convalescent and Undernourished.** People suffering from severe malnutriton were fed an acceptable and palatable drink made of dried whole milk and dried eggs. One of its great assets is that it was readily given in fluid form. The essential amino acids in these two foods supplement each other and permit maximum utilization for growth and repair. The availability and cost of this type of therapy allowed its use in the handling of mass starvation. A well-balanced ratio of amino acids must be present if the convalescent is to regain full weight and strength.

"Quality for 94 Years"

# MONARCH
## *finer Juices*

**ORANGE • GRAPEFRUIT**
**ORANGE and GRAPEFRUIT**

These are the friendly invitations on your menu whenever you serve Monarch Finer Citrus Juices.

The natural flavors of these sun-ripened fresh fruits are a promise to all of a main course that will insure mealtime enjoyment.

Serve Monarch Finer Citrus Juices . . . it's your way of inviting your guests to your finest of dishes with appreciative appetites.

Economical to serve . . . favorites to please . . . "tops" on your menu of GOOD THINGS TO EAT.

***Write, wire or phone for representative to call.***

**INSTITUTION DEPARTMENT**
**REID MURDOCH**
a division of Consolidated Grocers Corporation
*Coffee Roasters • Wholesalers*
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P. O. Box 5009 Chicago 80, Illinois

**IT PAYS TO SERVE MONARCH FINER FOODS**
*Always Dependable*

**History of School Lunch.** The year 1853 is the date of the earliest record of a school lunch plan for children. About 1790 certain European countries adopted the plan of the school lunch. However, England was not aroused about this until 1902. Evidences of malnutrition are often brought out by the occurrence of a war. In the last twenty years many other smaller countries, including those in South America, have begun school feeding. We must now see that school lunches are served in all parts of the United States and that the schools are able to handle government surpluses of food in well-planned meals with increasing new food flavors.

**"Waterless" Cooking.** In this method of cooking only enough water is used to keep the food from burning and to eliminate draining the cooked product. Several pieces of equipment have been introduced since 1920 which are specially designed for this type of cooking. Among these are included waterless saucepans with extra thick sides and bottoms and close-fitting covers; waterless cookers or steamers consisting of large outer pans with built-in heating units; pressure cookers; and the pressure saucepan, a smaller and more practical version of the pressure cooker. Of these four types, the first and last are still popular. In many instances methods of "waterless" cooking are not followed because of the care and attention required, and because of inadequate teaching and publicity of the methods. There are certain principles of design which are essential in saucepans of this type: (a) the utensil must heat quickly and uniformly; (b) retain heat indefinitely over a very low flame or electric coil; (c) retain heat for a considerable time after the source of heat has been removed; (d) the cover must allow for only a small escape of steam, but should be light enough to handle easily; and (e) the cover should be designed so that the condensed water vapor drips back directly onto the food. For best results the pan should be at least half full of food. Directions for proper procedure have been worked out by manufacturers for use with their particular utensils and should be followed. Not only vegetables, but fruits and meats may be cooked in essentially the same way as can cereals and packaged puddings.

**Keeping Flavor Where It Belongs.** The absorption of foreign flavors and odors is often responsible for off-flavors in foods. An off-flavor may be defined as a flavor which is out of place. Both taste and odor are important components of flavor. Flavor contamination is a cumulative absorption process due to odor rather than the tongue taste elements. Good ventilation in factories and warehouses is necessary to keep susceptible foods from absorbing foreign odors. The same problem occurs in bakeries and storage refrigerators. Flavor transfer is definitely less in the refrigerator where relative humidity is high, air movements low. The degree of contamination varies directly with the moisture loss of the food and inversely with the distance between contaminator and contaminated. Bland foods absorb odors most readily. Liquids become contaminated throughout, but non-liquids are usually flavor-tainted only on the surface. Covers on dishes help prevent flavor loss and contamination. Activated charcoal, which absorbs flavors on its surface, is the most common method of producing a neutral flavored product and removing off-flavors. However, protection of natural and desirable flavors is the ideal solution to the problem. For this, plant sanitation, careful processing, and ventilated storage are important.

**School of Baking.** The American Institute School of Baking in Chicago is a scientific, yet practical school established to assist bakers in solving the technological problems of baking. It was founded by leaders in the baking industry shortly after World War I. Basic sciences of chemistry, bacteriology, and physics; nutrition; efficiency in production problems; and other practical subjects are taught. Students already know the *how* of baking processes. At the school they learn the *why* and *when*. Baking has become an esteemed, highly mechanized industry. Current courses are divided into two sections, one covering the science and technology of baking, the other the practice of baking.

## BUILDINGS AND BUILDING MANAGEMENT

*Vol. 46, November, 1946*

A workable inventory control system.—p. 18.
*Maintenance of terrazzo floors. D. E. Smalley.—p. 36.

**Care of Terrazzo Floors.** The irregularity of design in terrazzo acts as a camouflage to extraneous matter on its surface and thus keeps it presentable longer. It is an extremely durable material which, unless subject to abuse, rarely needs replacement or repair. Damp mopping will clean unwaxed floors satisfactorily though the addition of soap insures better results. However, a soapy terrazzo is exceedingly slippery; therefore, thorough rinsing is important. A neutral soap is best, preferably in liquid form, for jellies and flakes produce a scum which collects dust. Acids and alkalies should be avoided as they result in slow disintegration of the floor. Abrasives are used to remove stubborn stains and accumulated water wax. Grease can be removed with a poultice of absorbent powder mixed with a solvent of the material causing the spot. Water emulsion waxes serve best for treatment and maintenance of terrazzo floors. With these, water is used only for stubborn stains. Dilution of wax when applying and thorough drying with a floor machine will minimize slipperiness.

## CONSUMERS' GUIDE

*Vol. 12, October, 1946*

*What's in the spice cupboard?—p. 6.
*Apple answers.—p. 9.
*Keep an eye on the potato.—p. 11.
Furniture firsts.—p. 12.

*Vol. 12, November, 1946*

*Tomorrow's food supply.—p. 9.
Guide to good eating.—p. 11.
*Autumn bounty.—p. 12.

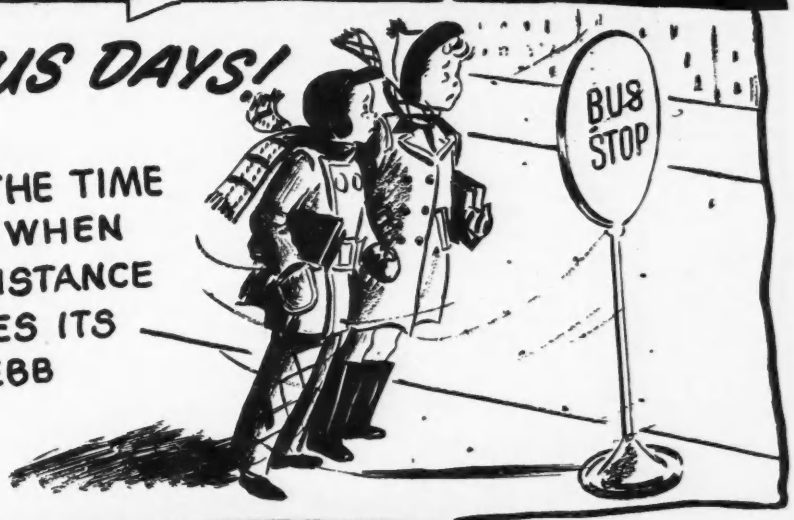
**Spices.** Our spice supply will be increasing. The U. S. had heavy supplies of spices on hand when the war struck. The Netherlands East Indies, Malay Peninsula, China, Indo-china, and Japan contribute 50 per cent; Europe and Africa, 23 per cent; British West Indies, 4 per cent; and India and Ceylon, 3 per cent of our spices. Since these sources were enemy occupied territories or war zones, the war greatly affected our supplies. The normal consumption of pepper is 30 to 40 million lb. a year. In recent months the U. S. has had only 25 per cent of this amount, and it will be a long time before pepper comes back to normal production. This also applies to the Malabar or Indian pepper and white pepper which is black minus its outer coating. Cassia and cinnamon were immediate casualties of Pearl Harbor, but now a substitute is synthetically produced. Nutmeg, which dropped to 60 per cent of normal supply, and mace, which fell to 40 per cent, are on their way back to normal with mace leading. There has been a moderate shortage of cloves but it is being corrected. The recent shortage was due to shipping and labor shortages rather than lack of supply.

**Apples.** This year's apple crop will be nearly two thirds larger than last year's harvest. Since apples are a versatile food as well as a perishable fruit, housewives should be on the alert and use more apples. Each species is best suited

# Post Scripts ... by Bob Dall

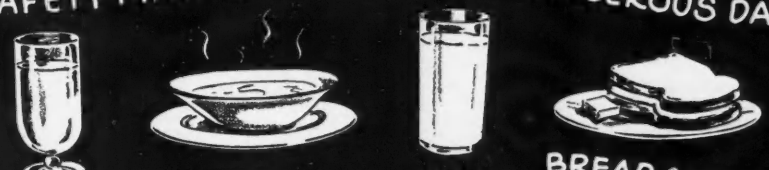
## DANGEROUS DAYS!

NOW IS THE TIME OF YEAR WHEN FOLKS' RESISTANCE APPROACHES ITS *LOWEST* EBB




Every Post Cereal is either WHOLE GRAIN or restored to WHOLE GRAIN VALUES in the important nutrients iron, niacin and thiamine

"SAFETY FIRST" BREAKFAST FOR DANGEROUS DAYS



FRUIT · CEREAL · MILK · BREAD & BUTTER (OR FORTIFIED MARGARINE)

A GENEROUS BOWLFUL* OF GRAPE-NUTS WHEAT-MEAL with milk and sugar supplies 200 calories and the following amounts and percentages of an adult's daily requirements:

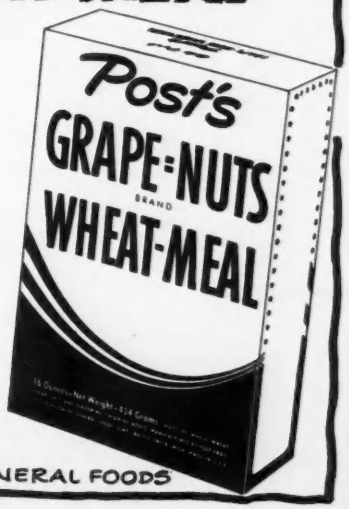
| | |
|---|---|
| Protein | 7.4 grams, 11% ** |
| Calcium | 160 milligrams, 21% |
| Iron | 1.3 milligrams, 13% |
| Riboflavin | 0.24 milligrams, 12% |
| Thiamine | 0.35 milligrams, 35% |
| Niacin | 1.6 milligrams, 11% ** |

* GRAPE-NUTS WHEAT-MEAL (1 OZ., DRY), MILK (4 OZ.), SUGAR (1 TEASPOON).

** PROTEIN BASED ON 70 G., NIACIN BASED ON 15 Mg.

## HOT 'N HEARTY WHOLE GRAIN! GRAPE-NUTS WHEAT-MEAL

COOKS IN 3 MINUTES!




POST'S CEREALS ARE PRODUCTS OF GENERAL FOODS

for a particular purpose. In deciding what apples to buy, consider their particular purpose and see if they measure up to the specifications. Some states have their own compulsory grading systems, while the U. S. Grades are voluntary. U. S. Fancy indicates top quality followed in order of diminishing quality by U. S. No. 1, U. S. Commercial, and U. S. Utility.

**Keep an Eye on the Potato.** The farmers of this country have harvested the largest crop of potatoes in history with only a 1 per cent increase in acreage over the prior year. This surplus of 20 million bu. over last year's crop cannot be used to feed the world's hungry. It is too costly to ship due to its perishability, its high water content, and its unpredictable storage loss. Potatoes are too costly to dehydrate at 20 to 30 cents a pound as compared with processing of flour at $\frac{6}{10}$ of a cent.

**FAO.** A review is given of the objectives of the Food and Agriculture Organization of the United Nations as determined at the second session which met in Copenhagen, Denmark. Of special interest to dietitians was FAO's recommendation that a joint consultation of experts develop sound and easily comparable food composition figures in order to examine the diverse diets and various food needs of many groups of people. A joint FAO-World Health Organization nutrition committee was proposed.

**Autumn Bounty.** This year there will be increased amounts of all nuts, except pecans which will be shorter due to bad weather and to insects. Peanuts are the most popular, followed in turn by English walnuts, pecans, almonds, and filberts. Nut production in 1945 was valued at $85 million, excluding the 29 per cent of the nuts we consumed which were imported. Nuts are a highly concentrated food rich in fat, good quality protein, and some minerals and vitamins. To make 1 lb. of kernels, it takes from $1\frac{3}{4}$ to $2\frac{1}{2}$ lbs. of unshelled nuts depending upon the variety. Serve blanched, salted, fried, or roasted.

## HORWATH HOTEL ACCOUNTANT

*Vol. 26, October, 1946*

*The trend of business in hotels.—p. 3.
A Supreme court decision costly to hotels. L. Toth.—p. 4.

**Business Trends in Hotels.** Country-wide average occupancy for August, 1946, registered 96 per cent, a gain of seven points over July's figure and four points over August, 1945. In Cleveland, 98 per cent occupancy was the highest the city has ever known. Only two cities—Philadelphia and Washington—showed lower occupancies than a year ago. Total sales increase was slightly lower than in July, with Cleveland having the largest increase—20 per cent—and Washington having the only decrease,—9 per cent. Chicago was one of the few cities to record a considerable increase in beverage sales. Total beverage sales have declined from those in August, 1945. This slump in the beverage business is usually the precursor of a decrease in all hotel sales, although this downward movement may not occur for some months.

## HOTEL MANAGEMENT

*Vol. 50, November, 1946*

Conserving linens and textiles. W. O. Voegele.—p. 44.
Insuring an economical hot water supply. C. Denny.—p. 47.
So you want to install a laundry! L. A. Bradley—p. 57.
*Why we changed over to paper containers. L. M. Gerstenheim.—p. 60.
Protecting your investment in refrigerators. E. W. Fair.—p. 62.

**Paper Containers.** A Brooklyn cafeteria serving 12,000 people daily has had a big dishwashing problem which has been aggravated by the shortage of help during the war and postwar years. For the past five years the use of paper containers has progressively been increased. First used for water, they are today successfully being used for side dishes, cabbage salads, desserts that are not too moist, cream, sirups, and certain other foods. Among the advantages of paper containers are increases in sanitary protection and the elimination of breakage costs along with materially lowering the dishwashing expense. The employees were somewhat skeptical when paper first was introduced in the restaurant; but as they became accustomed to it, they recognized its advantages for increased speed, decreased labor, and personal protection.

## HOTEL MONTHLY

*Vol. 54, October, 1946*

*Rebuilding the dining car service of a great railroad.—p. 36.

**Return of Dining Car Service.** During the war gracious food service received a severe setback in the nation's railroad dining cars. Department officials of the Pennsylvania Railroad decided complete retraining of all its employees would help speed its return. Three commissaries—in New York City, Chicago, and Columbus, Ohio—which have been maintained for years for new employees, are now retraining old employees many of whom had not been given its advantages during the war. Old dining cars located on sidings are used as classrooms. Training begins with 4 hr. of instruction during four different weeks. An entire dining car crew reports for class an hour before reporting to their respective jobs. First a film, "Hidden Dangers," is shown. The movie stresses the importance of sanitation by good and bad example. Another day, demonstrations are given. Waiters serve a meal as they believe correct, and details of service are noted. There is the standard "Pennsylvania way" for each single step which is insisted upon for system-wide uniformity. In the kitchen, standardization is stressed. Each food is prepared by a standardized method; dishwashing procedures are standard; and waste and sanitation measures are also carefully controlled. Importance of discipline and a courteous attitude toward both guests and other employees is emphasized.

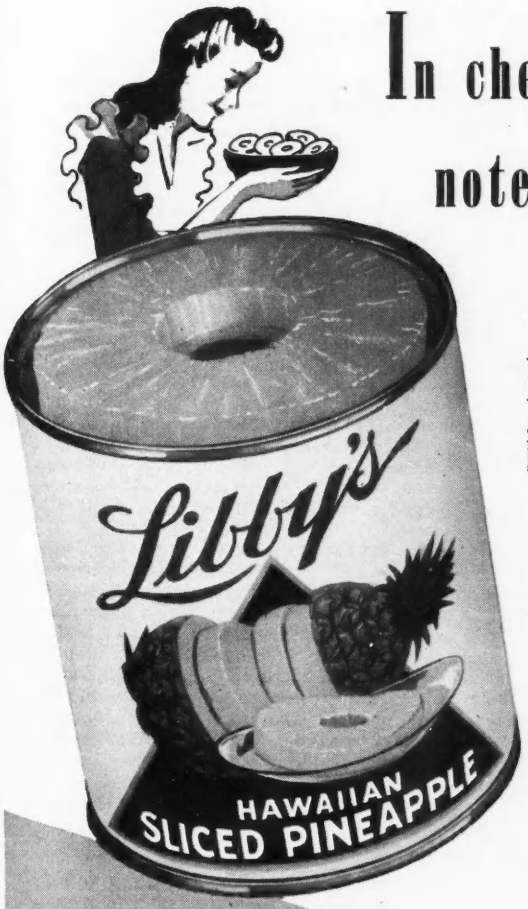
## PERSONNEL JOURNAL

*Vol. 25, October, 1946*

Labor's dilemma. L. K. Johnson.—p. 114.
England's business training scheme.—p. 121.
*The value of avocational experience. P. H. Casselman.—p. 127.
*Turnover begins with hiring. H. Slavin.—p. 142.
Canning to music. F. C. McPeak.—p. 145.

**Avocational Experience.** For various reasons, many workers today never find their proper place in the occupational structure. The modern practice of selecting men on the basis of past experience is not always good. Five years' experience in one field may make him only mediocre, while five months' training in another line may show that he is a natural-born wonder in this new field. A little more time spent with the employee with an eye to his avocational interests will reveal what he really can do. A study of his hobbies and social activities may uncover imagination, manual dexterity, leadership and organizational ability, cooperativeness, and so on. This information may be obtained through the application blank or through an interview. The fact that workers may resent your "prying into their private affairs" makes it necessary that you use utmost tact to inspire confidence. Be sure to impress upon him the fact that information is not asked for merely for the record; that it will never be used to discriminate against him; and that it will definitely be used to help him become vocationally adjusted.

**Turnover.** Substantial savings can be achieved by re-




# In checking quality of pineapple note: LIBBY'S FRESH FRUIT FRAGRANCE

## It tells you this famous brand is packed at PEAK FLAVOR

One way to check quality in canned pineapple is by the simple "aroma test." For instance, turn out some golden Libby's slices and note the *fresh* fragrance.

Such a fresh "perfume" is possible only when pineapple has been allowed to ripen to the very peak of its goodness, and then speedily packed under the most precise of methods. That's why Libby's always has such a wonderful flavor—a ripe goodness only Hawaii's *sun* can give!

Now, as pineapple is becoming more generally plentiful, again insist on *Libby's* for true pineapple perfection.

**LIBBY, McNEILL & LIBBY**
**Chicago 9, Illinois**

### You can again serve your old pineapple favorites!

For 5 long years Hawaiian pineapple has been in such short supply you may need to refresh your memory on the favorite dishes that were your menu standbys:

Illustrated is a salad made by topping Libby's Pineapple slices with a ring of green pepper, cream cheese, and coconut. And remember pineapple topped with cottage cheese, chicken salad, gelatin squares or a Waldorf salad. Again think of pineapple upside down cake. Also Libby's to glamorize meats—with ham loaf, corned beef hash, or other canned meats.

ducing turnover. Since many of the causes of turnover stem from the initial hiring, the use of interest, intelligence, aptitude, and personality tests, which are scientific tools designed to select the right person for a job, is recommended. To be interested in a job is vital. An applicant may be able to lie about this during an interview, but it will show up in a test. Aptitude, too, is very necessary, and while interest may grow, aptitude cannot. As a maladjusted worker is unproductive, troublesome, and costly, it is wise to use personality adjustment tests before placing a new worker.

## RESTAURANT MANAGEMENT

*Vol. 59, October, 1946*

Good food hints. L. P. DeGouy. p. 20.
Money making methods. F. Searing.—p. 27.
Modernizing an old-time saloon on a shoestring. M. Boston.—p. 29.
*Selling prefabricated frozen plate meals. E. R. Bitter.—p. 38.
Modern luncheonette management. E. M. Fleischman.—p. 40.
*Quantity cookery principles. A. Easton.—p. 44.
Common mistakes at the cash register. H. Ziegler.—p. 46.
*New York City's tested plan for training apprentice cooks. E. F. Hahn.—p. 47.
*Modern methods for protecting kitchens against fires. P. W. Eberhardt.—p. 52.

**Frozen Plate Meals.** The future of these meals is as yet uncertain. The housewife will not have as vital a part in the preparation of these dinners, and she may prefer to buy individually frozen foods and combine them. The busy career woman will probably choose the plate meals. Some of the frozen foods on the market today will soon carry the seal of approval of the Frozen Foods Consumers' Institute. The newest frozen foods include: beef and lamb stews, potted Swiss steaks, Welsh rarebit, French fries that do not require frying, pastries, and breads.

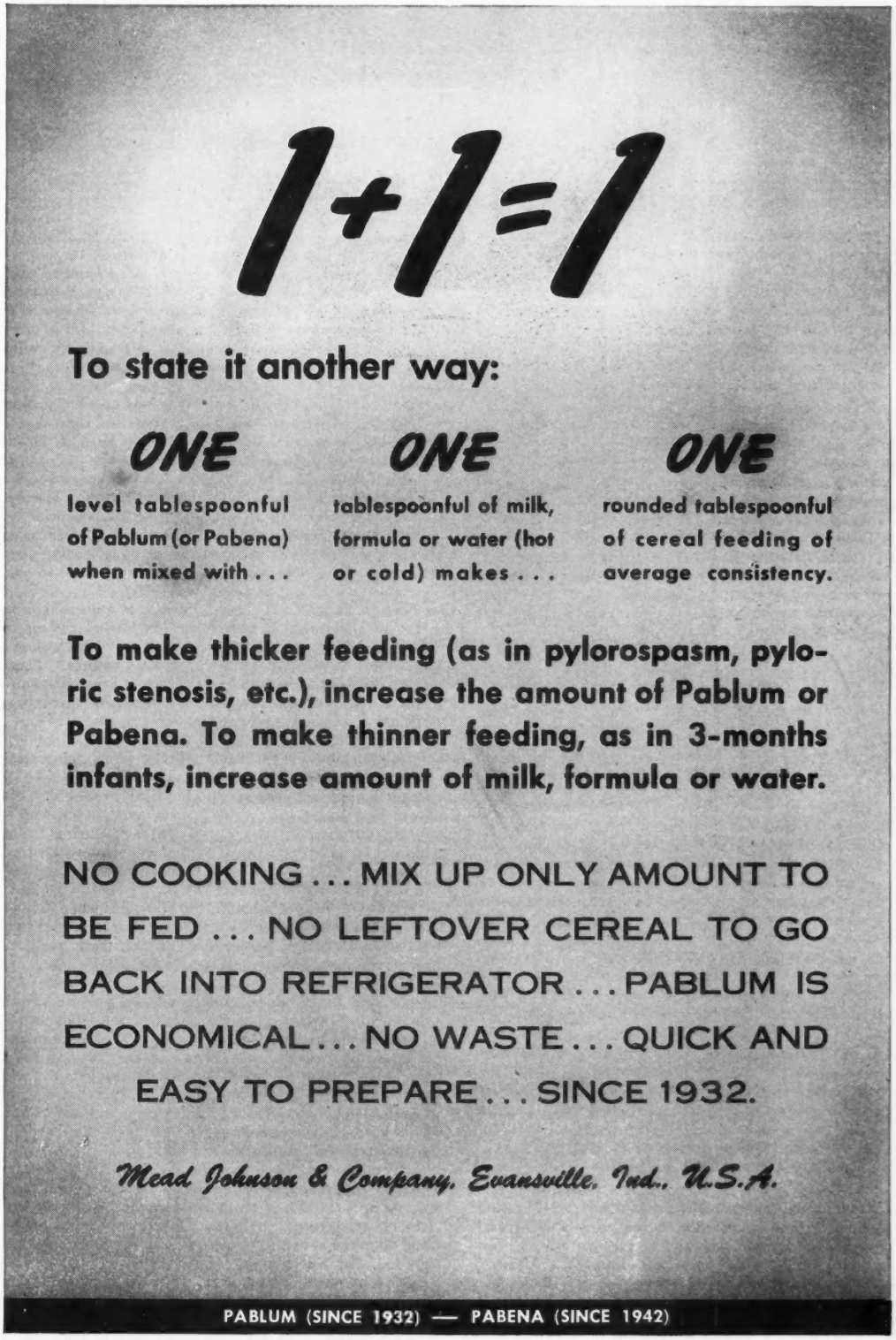
**Quantity Cookery Principles.** This is the ninth of a series of articles on the foremost fundamentals of food preparation. This article is on sandwich preparation. It is accompanied by panels giving: (a) the basic steps in sandwich making; (b) the stack method of making sandwiches; and (c) the board method of making sandwiches.

**Training Apprentice Cooks.** The American Culinary Federation in close cooperation with the Board of Education of the City of New York, the Hotel Association of New York, the Hotel and Club Employees Union Local #6 A. F. of L., together with a coordinator appointed by the Hotel Association and the Board of Education, formed the Joint Committee on Apprenticeship. To be accepted as an apprentice, the student must have at least six months' experience in bakery, butcher shop, cafeteria, or tea room classes; meet age and health requirements, and the coordinator must believe him capable of profiting from a culinary apprenticeship. Students receive training in the many stations of the kitchen to enable them to understand and appreciate the factors that make up correct food preparation. In addition, they receive training in the store room and in academic subjects which include the study of food sanitation and related science.

**Fire Protection for Kitchens.** There is a definite need for more and better fire protection in hotel and restaurant kitchens where the hazards are so constant. Carbon dioxide is an invaluable fire extinguisher for the kitchen because it is quick and will not harm foods. It is stored in cylinders as a liquid and when released by a valve, an inert gas expands and smothers a fire in a matter of seconds. Portable carbon dioxide extinguishers are available in various sizes and designs. In large kitchens, fire detectors, portable carbon dioxide cylinders, and built-in systems for the exhaust ducts will cover the main fire hazards. Smaller kitchens will avail themselves more readily to well-placed portables. Periodic check-ups on protective devices and good housekeeping are extremely important in fire prevention in every kitchen.

## *Carotene and Vitamin A in the Body*

In plants, vitamin A potency follows closely the yellow-orange color of fruits and vegetables. Thus sweet potatoes, carrots, and yellow turnips were active in curing vitamin A deficiency, whereas the white varieties were largely without effect. Soon the concept became established that the yellow plant pigments alpha, beta, and gamma carotene and kryptoxanthine were precursors of vitamin A in the body and that the transformation of these hydrocarbons to the alcohol vitamin A took place in the liver. The latter conclusion rested on the observations of Olcott and McCann that when liver tissue from vitamin-A-deficient rats was incubated with carotene, and the ultraviolet absorption spectrum of the brei was examined, there was evidence of the presence of vitamin A. These observations were both confirmed and denied in subsequent studies. Nevertheless the liver has been considered the site of change of carotene to vitamin A. Several older studies have shown that when carotene is administered parenterally, the vitamin A content of the liver is not increased. In a contribution to this subject, Deuel and his co-workers demonstrated that, whereas carotene given by the mouth is effective in combating vitamin A deficiency without evidence of accumulation in the liver, it has no effect in this situation when administered parenterally, although in the latter case there is active deposition of the pigment in the liver. Furthermore, it was shown that there is no destruction of carotene in the intestine. These observations not only raise the question with respect to the alleged part played by the liver in the change of the hydrocarbon pigment to vitamin A but also point to the intestinal wall as a possible site for this transformation. One needs only to recall the effective way in which the intestinal epithelium synthesizes fats from the products of enzyme hydrolysis of the fat in the food to concede that the foregoing explanation is reasonable. A sound concept of gastrointestinal physiology is the beginning of wisdom in nutrition. Deviations in absorption play an important part in clinical syndromes such as pellagra or pernicious anemia and in other nutritional deficiencies.—*From Current Comment, J. A. M. A. 132: 287, 1946.*


1+1=1
To state it another way:
ONE
level tablespoonful of Pablum (or Pabena) when mixed with . . .
ONE
tablespoonful of milk, formula or water (hot or cold) makes . . .
ONE
rounded tablespoonful of cereal feeding of average consistency.
To make thicker feeding (as in pylorospasm, pyloric stenosis, etc.), increase the amount of Pablum or Pabena. To make thinner feeding, as in 3-months infants, increase amount of milk, formula or water.
NO COOKING . . . MIX UP ONLY AMOUNT TO BE FED . . . NO LEFTOVER CEREAL TO GO BACK INTO REFRIGERATOR . . . PABLUM IS ECONOMICAL . . . NO WASTE . . . QUICK AND EASY TO PREPARE . . . SINCE 1932.
Mead Johnson & Company, Evansville, Ind., U.S.A.
PABLUM (SINCE 1932) — PABENA (SINCE 1942)

# News Notes

**Plan for Nutrition Center.** A National Nutrition Center in Birmingham, Alabama, was proposed at a meeting of the board of directors for Spies Clinic in November. The main purposes of the Nutrition Center will be: (a) to teach physicians, through clinics, seminars, and symposiums, the best ways to combat human malnutrition; (b) to engage in all types of nutritional research; (c) to treat persons suffering from malnutrition; and (d) to provide the public with new knowledge resulting from the work of the Center.

**Awards for Sugar Research.** Dr. Harlow Shapley, chairman of the National Sciences Fund of the National Academy of Sciences, recently announced that prizes totaling $40,000 have been posted by the Sugar Research Foundation. The competition was established "to stimulate scientific studies of sugar as a food and an industrial raw material which may lead to its greater usefulness." Awards of $5,000 each will be given in 1947, 1948, and 1949, and a grand prize of $25,000 will be given in 1950 for the "most significant discovery of the preceding five years." Winners of the preliminary awards are also eligible for the grand prize. The 1947 award will be announced on or about March 15.

**Lost and Found.** Three fountain pens, three pairs of gloves, and a pair of glasses in a case were found at the A. D. A. Convention in Cincinnati last October. If persons losing any of these articles will write, identifying the lost item, the Association will be glad to return the lost articles to their owners.

**Poor Diets in India and China.** An interesting exhibit in the meat gallery of the International Live Stock Exposition, held in Chicago in December, was a display prepared by the National Live Stock and Meat Board under the direction of Anna Boller of the average meal in China and India as compared with the average Australian or American meal. Figures on food consumption were gathered from a number of sources, including the *World Food Survey* of the FAO. Complete meals typical of each country were shown, as well as a week's supply of all foods consumed by the average person. The Chinese and Indian diets were shown to be high in cereals, low in animal protein, and low in total quantity, while the U. S. and Australian diets are well rounded in total content and high in total quantity. The averages of height and weight of adults and the life expectancy in the four countries were also compared.

**Restaurant Training for Business Administration Graduates.** An apprentice training program of fifteen months' duration is being established by the National Restaurant Association for graduates in business administration. The program has been inaugurated to familiarize future executives in the restaurant field with the activities of the kitchen. The plan is to pay the students while they are in training.

**Food Production Figures.** The original goal of 267 million bu. of grain for export for the year ending June 30, 1947, has been raised to 400 million bu., and now it appears that as much as 550 million bu. could be exported if sufficient transportation were available. Due to the shortage of box cars, there may be difficulties in the movement of as much as 400 million bu. It would require an estimated 800 freight cars to be loaded with grain every working day from last Thanksgiving until the deadline in order to reach the export goal.

The world corn crop in 1946–47 is forecast at about 5.5 billion bu. If correct, this will be the largest crop on record. The bulk of the increase is attributed to the record crop in the U. S., which represents about 65 per cent of the world total. Import needs are expected to be greatly reduced in some areas that had large requirements last year.

The 1946–47 sugar production is estimated at 30 million short tons, about 12 per cent more than the 26.7 million tons produced in 1945–46, but 14 per cent less than the prewar (1935–39) average of 34.7 million tons. Most of the increase is in beet sugar.

Milk production in 1946 showed a recovery in the important European producing countries from the low wartime levels, but was still 18 per cent less than prewar output. Production decreased in Canada and the U. S. last year but the output per cow was greater due to extensive culling of low-producing cows. It was, however, about 15 per cent greater than before the war.

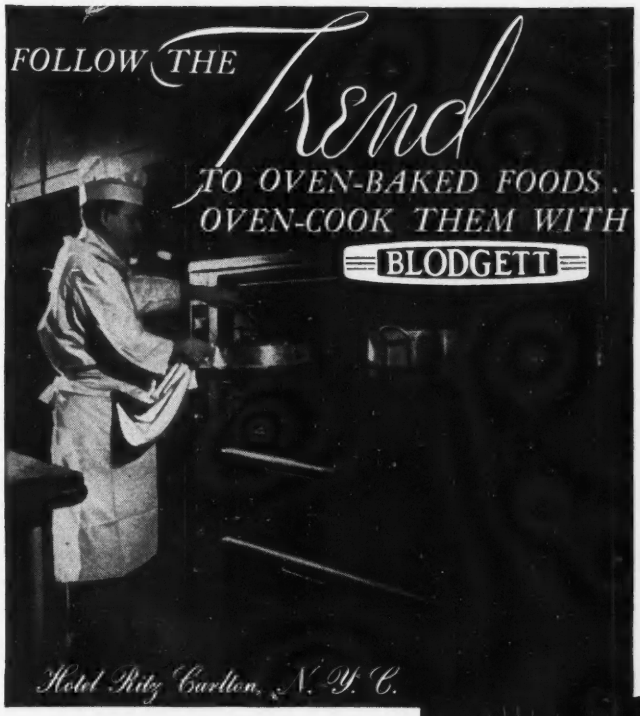
The U. S. winter crop of spinach is expected to exceed last year's crop by nearly a million bushels. Most of the fresh winter spinach comes from Texas, with California and Louisiana producing the next largest amounts. The gritty sand which has long been a problem in preparing spinach is now a thing of the past, for much of the spinach is now trimmed, washed, and packaged in transparent bags, ready for the kettle.

**Dehydrated Fresh Peas.** USDA plant scientists have been able to dehydrate fresh peas successfully so that the resulting product is an acceptable food for cooking. In this work they found that young tender peas are not well suited for dehydrating for they wrinkled greatly during drying and did not come back to their original smoothness when soaked in water. Also, they turned slightly brownish and changed in taste if stored for a year.

However, peas of medium and large size when dehydrated have been found to keep well when stored for a year in closed glass jars at 70°F. They also held their fresh qualities well and remained good in color, flavor, and texture. They ranked along with dehydrated sweet corn, sweet potatoes, green and Lima beans, and they have proved superior to dehydrated carrots, pumpkin, squash, and Irish potatoes.

Scientists believe that good dehydrated peas might find a large market, if housewives and institutions are given an opportunity to learn how acceptable they are. The pack of canned peas is normally larger than that of any other vegetable except tomatoes. This year, because of the prevailing tin shortage, dried peas might well be substituted for some of the volume of canned peas.

**Meat Grading No Longer Mandatory.** With the removal of OPA ceilings on meat on October 15, the federal grading of meats and the use of the purple stamp became an optional matter with meat packers. During the war, between 90 and 95 per cent of all the meat sold in the U. S. was federally graded. It was stamped Choice, Good, Commercial, or Utility by the official grader. The extent to which federal grading will be continued now depends largely on consumer demand.

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**New Book Club.** The Dahl Publishing Company has inaugurated the "Dahl Book Club for Hotel and Restaurant Executives." Members receive a monthly news letter, containing information about current books pertinent to the hotel and restaurant fields. From this list members may order any book they think will be helpful. Books on the following topics are listed: accounting, advertising and promotion, beverage service, catering, decorating, engineering, fiction, housekeeping, management, and personnel. With the first issue a supplement listing almost a hundred cook books was included.

**"Food Bank" for Frozen Foods.** In Memphis, Tennessee, a "food bank" is operating like a real bank under the supervision of the Tennessee Banking Department. Bonded "tellers" receive or disburse the customers' food. Customers are not permitted inside the food vaults, but are given statements of their food balances.

**College Health Conference.** Thirty-five organizations in health and education will sponsor the Third National Conference on Health in Colleges to be held in New York City, May 7 to 10, 1947. This is the first meeting of its kind in more than ten years. Working committees for the conference have been appointed to plan for the six sections of the conference. Housing, sanitation, nutrition, guidance, and recreation will be considered by one section, under the chairmanship of J. Wilbur Armstrong, M.D., of Berea College. In order to make available the best information on college health practices, the proceedings of the Conference will be published in book form.

**Food Cost Control.** A portion of four consecutive issues of the USDA publication, *Serving Many*, is being devoted to a study of cost control. The topics to be discussed are: "Food Cost Control Is Good Business"; "Establishing Food Cost Control in Your Plant"; "Using Cost Control Records to Give Essential Facts"; and "Analyzing and Interpreting Financial Records and Reports." Copies may be obtained by writing to the Industrial Feeding Program, Food Distribution Programs Branch, Production and Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C.

**New Research Laboratory at Alabama.** On December 7, the staff of the new Research Laboratory of Human Nutrition at the University of Alabama held open house. The research projects now being carried on in the new laboratory are: development of low cost soup mixtures of high nutritive value for use in institutional feeding; appetite levels of food consumption in Alabama; the utilization of dehydroascorbic acid; ways and means of extending nutrition information to children and their families; comparative food cost study; new food uses of legumes; the microbiological assay of nicotinic acid in blood—a possible measure of nutritional status. Director of the laboratory is Dr. E. Neige Todhunter.

**Former JOURNAL Editor in New Position.** Mary Pascoe Huddleson, with the January issue, became food service editor of *Modern Hospital*. As A. D. A. members know, Mrs. Huddleson served ably and well as editor of the JOURNAL for nineteen years until her resignation last spring. At the Cincinnati meeting of the Association last fall, Mrs. Huddleson was presented the Marjorie Hulsizer Copher Award for 1946 in recognition of her service to the Association.

**Food and Athletics.** The first of February, Arnold Shircliffe, manager of the well-known Wrigley Building Restaurant in Chicago and A. D. A. member, left for a six-week stay on Catalina Island. While there, he will be in charge of the feeding of the Chicago Cubs baseball club during its spring training. Mr. Shircliffe told the JOURNAL reporter that a dining room will be set up where the Cubs will be served hearty and nourishing breakfasts and dinners. For lunch, the players will be served right of the playing field. This is a new field to show recognition of the importance of food to good performance and we wish Mr. Shircliffe success in this project.

**Survey on Consumer Food Preferences.** The American Home Economics Association recently conducted a nationwide survey revealing consumers' preferences in the qualities of bread and meat. It was found that women would welcome government grading of all meat, including poultry, and the use of a stamp easily seen, perhaps with colors to designate the various grades. They prefer that meat be cut at the time of purchase and would like more small cuts and boned meats. Standardized practice in meat cutting would also be appreciated. They would like more information on how to cook less tender cuts of meat. Women prefer bread enriched with iron and vitamins, made with milk, and labeled with the nutritional content and the net weight. Some would like ½ lb. loaves and thin-sliced bread for sandwiches.

**New Soybean Booklet.** The Michigan State College Agricultural Experiment Station has recently published a booklet titled, *Soybeans and Soy Products in Quantity Cookery* by Margaret M. Childs, Elizabeth Gruginskis Additon, and Mabelle S. Ehlers. Many uses for soybeans are given as well as recipes for quantity preparation of soy products.

**Altitude Cookery.** The Colorado State Experiment Station has recently issued a collection of recipes for various altitudes. Leavening should be decreased as the altitude increases while water content should be increased. The internal temperature attained within a baking cake will be at least 18°F. lower at 10,000 ft. than at sea level due to the lowered boiling point. Suggestions for measurement, equipment, and general baking and mixing methods are discussed in the report.

**Restaurant Associations Will Meet.** The 28th Annual Convention and Exposition of the National Restaurant Association will be held March 25–28, at the Stevens Hotel, Chicago. The Canadian Restaurant Association will hold its Third Annual Convention and Exposition at the Royal York Hotel, Toronto, from April 21–23.

**A.A.A.S. Bulletin Discontinued.** After almost five years, the publication of the *American Association for the Advancement of Science Bulletin* has been discontinued because of the expense and the inability to get paper. The editors of *Science* and *Scientific Monthly* have offered a page in each issue of their respective journals for announcements and news items about the functioning of the Association.

**The National Garden Conference,** held in Washington on December 5 and 6, discussed the continued need for home gardens. Among the speakers was Frank G. Boudreau of the National Research Council who spoke on "Meeting Dietary Deficiencies."

**Victoria (Australia) Dietetic Association.** The September 1946, issue of the *Newsletter* states that a sheet, "Make Dietetics Your Career," prepared by the Publicity Committee was sent to 260 secondary girls' schools of Victoria. Discussion on the amalgamation of the Association with the New South Wales Dietetic Association to form a Federal Dietetic Association took place at the August meeting.

## News of State Associations

**Georgia Dietetic Association.** The annual fall meeting of the Georgia Dietetic Association was held November 16 at the Piedmont Hotel, Atlanta, with Hazel Hayden, president, presiding. Among the speakers were Maniza Moore, who spoke on "The Value of Professional Affiliation"; Bertha Biltz, whose subject was "Blueprints of the Association"; and Dr. R. Hugh Wood, who talked on "What a Physician Expects from a Dietitian."

The *Atlanta Dietetic Association* was reorganized follow-

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ing the meeting of the State Association and the officers elected were: President, Frances Koeth; Vice-president, Gertrude McDonald; Secretary, Mary Sorrells; and Treasurer, Peggy Newsom. The first monthly meeting of the Association was held on December 2. Malcolm Bryan spoke to the group on "The Economic Outlook."

**Indiana Dietetic Association.** Plans for state meetings on February 14 and April 25–26 are now being made.

New members on the staff at Methodist Hospital, Indianapolis are: *Elizabeth Flanagan*, who trained at Harper Hospital, Detroit; *Mary Paschal* and *Dorothy Bates*, former student dietitians at Massachusetts General Hospital, Boston; and *Joye Miller*, who came from the student dietitian's course at Indiana Medical Center, Indianapolis.

The sixteen new student dietitians at Indiana University Medical Center represent fourteen colleges from ten states.

**Kentucky Dietetic Association.** The *Blue Grass Dietetic Association* met at the Home Economics Building of the University of Kentucky, November 46. The speaker of the evening was Colonel Phillip Wilson who spoke of his experiences while serving with the Air Forces in India.

*Frances M. Croker* is the senior assistant dietitian for the U. S. Public Health Hospital in Lexington. She was formerly at the U. S. Marine Hospital in Louisville. *Charleen Burris*, recently graduated from the approved training course at Mills College, Oakland, California, is now assistant dietitian at the Residence Hall for Women at the University of Kentucky.

**Louisiana Dietetic Association.** New officers of the Association for 1946–47 are: President, Chloe Robinson, Southern Baptist Hospital, New Orleans; President-elect, Dorothy Moschette, Louisiana State University, Baton Rouge; Vice-president, Edith Holt, director of school cafeterias, Shreveport; Secretary-treasurer, Irene Tolliver, Louisiana Polytechnic Institute, Ruston.

**Maryland Dietetic Association.** The November meeting of the Maryland Dietetic Association was held at Sinai Hospital, Baltimore, with the program planned around the reports of those members who had attended the American Dietetic Association meeting in Cincinnati. In November, as part of the project for the recruitment of student dietitians, the Professional Education Section sponsored a talk to a group of girls at Eastern High School, Baltimore. Janette Carlsen and Jean Miller, both of Johns Hopkins Hospital, were the guest speakers.

According to custom, the December meeting of the Association was a social meeting. The members were entertained at a Christmas party, December 3, held in the nurses' residence of the Union Memorial Hospital, Baltimore.

**New York Dietetic Association.** One of the projects of the *Buffalo Dietetic Association* is promoting the knowledge and use of *Dietetics as a Profession* in schools. The booklet was brought to the attention of the Western New York Home Economics Teachers at their spring meeting, as well as to some of the principals of suburban high schools. An informal talk and conducted tour of a hospital was given for freshman home economics students of State Teachers College. Mrs. C. C. Furnas, chairman of the Vocational Guidance Program of the American Association of University Women, Buffalo branch, has given information about the booklet to any organization or school at which she has been asked to speak.

The *Greater New York Dietetic Association* held its December meeting at the Roosevelt Hospital. Dr. Arthur J. Patik spoke on the value of the high-protein diet in treatment of cirrhosis of the liver. Following the meeting, a Christmas repast was served in the cafeteria by Dorothy DeHart. Members of the Association were invited to a public hearing of the New York State Joint Legislative Committee on Nutrition on December 11. Many phases of nutrition affecting the state were discussed.

**Pennsylvania Dietetic Association.** New officers for 1946–47 of the *Pittsburgh Dietetic Association* are: President, Genevieve Malloy, School Lunch Program; Vice-president, Helen Baum, Presbyterian Hospital; Treasurer, Eleanor MacLean, Western Pennsylvania Hospital; Secretary, Onnalee Jones, Children's Hospital. There are now six student dietitians in training at Allegheny General Hospital.

**South Carolina Dietetic Association.** The tenth annual meeting of the Association was held jointly with the South Carolina Home Economics Association's 32nd annual meeting on November 22 and 23 at the Wade Hampton Hotel, Columbia. The theme of the meeting was "The Home Economist Meets the Present Situation." Dr. E. Neige Todhunter, University of Alabama, was the principle speaker. A panel discussion was also held on the topic, "Recruitment for Home Economics."

**Utah Dietetic Association.** On December 10 the Association held a meeting at Carlson Hall on the University of Utah campus. Marie Driscoll, director of the residence hall, was hostess. The state health education consultant, Joseph Cailing, was guest speaker.

**West Virginia Dietetic Association.** The second issue of the *Bulletin* has recently reached the JOURNAL office. In this issue begins a series of articles on West Virginia hospitals in which members of the American Dietetic Association are employed. The first hospital to be featured was St. Joseph's Hospital, Parkersburg, West Virginia. A plan of the kitchen is presented in a two-page spread, as well as information about the operation of the Dietary Department.

## News about Members

**Josephine Adams** has left the Illinois Masonic Hospital, Chicago, and is now a member of the Dietary Department of Henrotin Hospital, Chicago.

**Dorothy E. Allinger** on November 15 accepted a new position as staff dietitian at the University of California Hospital, San Francisco. Formerly she was at St. Luke's Hospital, Cleveland.

**Beth Ashman,** who recently completed training at the Miami Valley Hospital, Dayton, is now the dietitian in the poliomyelitis ward of the Salt Lake County General Hospital, Salt Lake City.

**Helen Badger,** previously a student dietitian of the Albany Hospital course for student dietitians, Albany, New York, is now assistant dietitian at Dee Memorial Hospital, Ogden, Utah.

**Carolyn Bass,** formerly a member of the Dietary Department, Michael Reese Hospital, Chicago, became staff dietitian at McGuire General Hospital, Richmond, Virginia, on November 12.

**Mary Beckstead,** formerly a student dietitian at Scripps Metabolic Clinic, La Jolla, California, has accepted a position as therapeutic dietitian at Dr. W. H. Grove's Latter Day Saints Hospital, Salt Lake City.

**Lynette Bishop** has left Massachusetts General Hospital, Boston, for a new position with the Cafeteria Department, Board of Education, Hartford, Connecticut.

**Harriet Boyle,** until recently teaching dietitian at St. Luke's Hospital, New York, is now at Memorial Hospital, Albany, New York.

**Annibelle Brown** has accepted a position as floor dietitian at Children's Hospital, Pittsburgh.

**Ruth A. Carson** has a new position as dietitian at the Baptist Memorial Hospital, Memphis.

**Hazel Chapin** has left Camp Shelby, Mississippi, to accept a position at the Mary Hitchcock Memorial Hospital, Hanover, New Hampshire.

**Kathleen P. Cleary** has accepted a position at the University of Chicago Clinics, Chicago.

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**Grace Clougherty** is now relief dietitian at Magee Hospital, Pittsburgh. She was formerly a student dietitian at St. Marys Hospital, Rochester, Minnesota.

**Jeanne H. Cox** has a new position in the Dietary Department of Grace Hospital, Detroit.

**Lorena Croft** has moved from New York City to Lexington, Kentucky, where she is with the U. S. Public Health Service.

**Mary Jane Dingledine** is now a member of the staff at City Hospital, Indianapolis. She has been a ward dietitian at Baptist Hospital, Winston Salem, North Carolina.

**Gertrude Edinger** is now the dietitian for Horne's Department Store, Pittsburgh.

**Gloria Emery,** on completion of her training at King County Hospital, Seattle, became the new head dietitian at the Salt Lake County General Hospital, Salt Lake City.

**Ethel C. Erni,** until recently at the U. S. Marine Hospital, Savannah, Georgia, has been transferred to the U. S. Public Health Service Hospital, Fort Worth.

**Gloria H. Fallan** is now home service demonstrator for the Montana Power Company, Butte, Montana.

**Marie Fecht** has resigned her position at Evangelical Deaconess Hospital, Detroit, to accept a position at Barnert Memorial Hospital, Paterson, New Jersey.

**Rita Fitzgerald** is the new therapeutic dietitian at St. Luke's Hospital, New York City.

**Eleanore Fonti** has joined the staff at St. Marys Hospital, Rochester, Minnesota.

**Gertrude E. Fox** is now employed at Mercy Hospital, Independence, Kansas. She was formerly at Colorado State Hospital, Pueblo.

**Rosamond M. Fox** has left the California Lutheran Hospital, Los Angeles, to join the staff at La Vinia Sanatarium, Pasadena.

**Judith Gold** has joined the staff of Johns Hopkins Hospital, Baltimore, as assistant administrative dietitian.

**Beatrice F. Goldstein,** formerly with the Veterans Hospital, Huntington, West Virginia, is now at Beth Israel Hospital, Newark, New Jersey.

**Elizabeth Goodman** is now the director of food service at the University of Utah. Formerly she was at the Illini Union at the University of Illinois.

**Florence B. Gravelle** has left Massachusetts to return to California where she has a new position with the Los Angeles City Health Department.

**Ruthe Guthrie** has accepted a position as assistant dietitian at Troy City Hospital, Troy, New York. She is a recent graduate of the student dietitian training course at Albany Hospital, Albany, New York.

**Doris A. Hanson** has accepted a position as assistant dietitian at Corwin Hospital and Clinic, Pueblo, Colorado.

**Annie Joe Hardage** is the new ward dietitian at Jefferson-Hillman Hospital, Birmingham, Alabama.

**Jane Hartman,** formerly at Sinai Hospital, Baltimore, is now employed by the State of Maryland Department of Health, Baltimore.

**Ruth W. Harvey** has been appointed chief dietitian at the Jones Memorial Hospital, Wellsville, New York. She formerly was chief dietitian at Community Hospital, Kane, Pennsylvania.

**Constance Hayes** is the new manager of the dining hall of the Harvard Medical School, Boston.

**Priscilla Louise Hewey,** until recently employed in the Food Clinic of the Boston Dispensary, is now assistant nutrition adviser, Eastman Kodak Company, Rochester, N.Y.

**Emily Horton,** recently released from the Army, has accepted a position at Ellis Hospital, Schenectady, New York.

**Hope E. Hosmer** is no longer at the U. S. Marine Hospital, Stapleton, Staten Island, New York. She is now at the Charles T. Miller Hospital, St. Paul, Minnesota.

**Lila M. Jones,** recently released from the Army, has joined the staff of *Good Housekeeping.*

**Ruth Odette Klingler,** a recent graduate from the King County Hospital student dietitian course, Seattle, is now therapeutic dietitian at Dr. W. H. Grove's Latter Day Saints Hospital, Salt Lake City.

**Elizabeth Ann McCarthy** joined the staff of the Johns Hopkins Hospital, Baltimore, as administrative consultant. She was formerly employed at Massachusetts General Hospital in Boston.

**E. Doris McCloskey** accepted a position as teaching and therapeutic dietitian at Paterson General Hospital, Paterson, New Jersey, on November 5.

**Mary McFarland** recently joined the staff at St. Luke's Hospital, Chicago. Formerly she was in the Department of Dietetics at the University of Michigan Hospital, Ann Arbor.

**Catherine McGrath** has been transferred from the U. S. Public Health Service, Brooklyn, and is now at the U. S. Marine Hospital, Ellis Island.

**Mary Catherine Male** became teaching dietitian at St. Luke's Hospital, Kansas City, Missouri, on September 30.

**Elizabeth Manthey** became dietitian at Massachusetts General Hospital on October 14.

**Alice Matsumoto** recently accepted a position as therapeutic dietitian at Grace Hospital, N. W. Branch, Detroit.

**Dolores F. Moore** is the new dietitian for Winfield Sanatorium, Winfield, Illinois.

**June M. Morris** has accepted a position in the Dietary Department at Michael Reese Hospital, Chicago.

**Marjorie M. Morrison** recently became nutritionist for the U. S. Public Health Service, Grand Haven, Michigan.

**Glenna Marie Parkin** is the new supervisor of the Coffee Shop at the University of Utah.

**Elizabeth Paulsen** is now assistant dietitian at Albany Hospital, Albany, New York. She is a graduate of the student dietitian course at the same hospital.

**Joyce Payant,** formerly a therapeutic dietitian at St. Elizabeth Hospital in Chicago, is now at St. Vincent's Hospital, Indianapolis, as therapeutic dietitian.

**Shirley Perlmutter** began her new work as clinic dietitian at St. Vincent's Hospital, New York City, on October 27.

**Rose Marie Quint** has accepted a new position as assistant dietitian at St. Joseph's Hospital, Burbank, California.

**Mary Jane Quirk** recently became educational dietitian at St. Luke's Hospital, St. Louis.

**Dorothy Raber** is a member of the staff at the Union Cafeteria of Indiana University.

**Edith Mary Sanderson,** following the completion of her student dietitian training at the University of Minnesota Hospital, Minneapolis, accepted a position as head dietitian at Clifton Springs Sanitarium and Clinic, Clifton Springs, New York.

**Bernice L. Schaad** on November 11 became the new therapeutic teaching dietitian at St. Joseph's Hospital, Tacoma.

**Harriet Schupp** has joined the staff at Albany Hospital, Albany, New York, following her separation from the Army.

**LaJean Sessions** is the first dietitian at Budge Memorial Hospital, Logan, Utah. She recently completed her training at the King County Hospital, Seattle.

**Carol L. Sheldon** has left the University of Maryland Hospital, Baltimore, to accept a position as therapeutic dietitian at Washington County Hospital, Hagerstown, Maryland.

**Sister Dorothea Orzel** has been transferred from St. Elizabeth's Infirmary, Mount Alvernia, Reading, Pennsylvania to the Bernadine Sisters, Kingston, Pennsylvania.

**Norvelle Somerville** resigned her position at Meharry Medical College, Nashville, and is now at Bennett College, Greensboro, North Carolina.

**Pearl Ditkowsky Spiegel** has opened an office as consultant dietitian in Chicago.

**Adelyn Stegall** has left Bowling Green, Kentucky, to take charge of the Special Diet Kitchen, Vanderbilt University Hospital, Nashville, Tennessee.

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**Ruth V. Strayer** is now administrative dietitian at Miami Valley Hospital, Dayton, Ohio.

**R. Claire Street** recently accepted a position as dietitian at the Methodist Hospital, Sioux City, Iowa. She was previously at the University of Michigan Hospital, Ann Arbor, Michigan.

**Jean Carey Sullivan** is now at U. S. Thayer Hotel, West Point, New York. Previously she had been at Fitzsimons General Hospital, Denver.

**Angela Taylor,** until recently a student at Charlotte Memorial Hospital, Charlotte, North Carolina, is now junior assistant dietitian at Vassar Brothers Hospital, Poughkeepsie, New York.

**Mildred Tolles** has left Mary Lanning Hospital, Hastings, Nebraska, to accept a position in the Dietary Department of the Methodist Hospital, Sioux City, Iowa.

**Amy Hua Tsiang** recently returned to China to work with UNRRA.

**Grace Huglin Verburg** has left Dexter, Iowa, to become therapeutic dietitian for Holleran Medical Group, Hollywood, California.

**Betty Jane Walter,** formerly at Children's Memorial Hospital, Chicago, has accepted a position as food service director at the Y.W.C.A., Lansing, Michigan.

**Helen Walz,** a recent graduate of the student dietitian training course at University Hospital, Baltimore, Maryland, is now nutritionist, Beechnut Packing Company, Chicago.

**Alice Louise Whittaker** is now home economist for Roxbury Neighborhood House, Roxbury, Massachusetts.

**Zulu Williams** is the new chief dietitian at Santa Barbara General Hospital, Santa Barbara, California. Until recently she was dietitian at the Presbyterian Home, Evanston, Illinois.

**Alice L. Wood** has resigned her position at Strong Memorial Hospital, Rochester, New York, to accept a position as head dietitian at Ventura County Hospital, Ventura, California.

**Nadine Worthy,** formerly employed as private room dietitian at Jefferson Hospital, Birmingham, Alabama, has accepted the position of head dietitian at Selma Baptist Hospital, Selma, Alabama.

**Ruth Yakel,** formerly a student dietitian at the Indiana University Medical Center has accepted a position at the University of Utah as instructor in foods and nutrition.

**Margaret Zettle,** until recently at Cooper Hospital, Camden, New Jersey, is now teaching at Ellis College, Newton Square, Pennsylvania.

**Correction.** Edith E. Ames is assistant professor of institution management and assistant cafeteria manager at the University of Minnesota—not cafeteria manager, as September JOURNAL announced.

The following A. D. A. members have recently been married:

**Marie E. Baron** was recently married to William E. Profitt, Sr.

**Captain Jean Bates** became the wife of Lieutenant Richard Welch on September 29.

**Jane Beeson** (**née Stander**) was recently married and now has a position at the Medical and Surgical Memorial Hospital, San Antonio, Texas.

**Gladys Binder** (**née Grant**) was recently married and has moved from San Antonio, Texas, to Oakland, California.

**Mille Frances Brooks** is now Mrs. William Ogden and is living in Brooklyn, New York.

**Mary Margaret Budd,** former therapeutic dietitian at Butterworth Hospital, Grand Rapids, Michigan, was married on October 26 at Aurora, Illinois, to Richard Bieber.

**Helen Amsden Cushman** recently became Mrs. David P. Angle. She is now on the staff of the Delaware State Hospital, Farnhurst.

**Laurel Decker** is the new Mrs. Richard Starr. The couple are living in Indianapolis.

**Margaret DeVries** was married to Donald Ketchum on November 24 in Ames, Iowa. She has resigned her position at Albany Hospital, Albany, New York, and will live in Voorheesville, New York.

**Shirley B. Diamond** (**née Berman**) was recently married and has moved from Liberty, New York, to Merrick, Long Island.

**Edith Dunlap** (**née Wood**) was recently married and is now living in San Fernando, California.

**Julia C. Dwight** is now Mrs. M. S. Stevens. They are living in Everett, Massachusetts.

On September 10, **Jane Turnbull Elmore** became the bride of Robert E. Gibson. Mrs. Gibson was formerly in the Dietary Department of the Medical College of Virginia Hospital, Richmond.

**Helen Falcone** (**née Fjosee**) was married recently. The couple are making their home in Chicago.

**Eleanor Ferguson** was married on August 24 to John Juntington Ferry. They are at home in Tucson, Arizona.

**Marcia J. Finks** is now Mrs. Irving M. Bell. They are living in Lewiston, Maine.

**Elizabeth Fogarty** resigned her position at the Ancker Hospital, St. Paul, Minnesota, and has moved to North Dakota following her marriage to Bernard C. Devney.

**Genevieve Fossatti** became the wife of Clarence Pierce on September 3. She will continue on the staff at Albany Hospital, Albany, New York.

**Kathryn Franta** recently became the bride of Tom Fason and the couple are living in Dayton, Ohio. Mrs. Fason is on the dietary staff of the Miami Valley Hospital.

**Mrs. Dorothy T. Gerhart** (**née Tomlinson**) was recently married and is now on the staff at Birmingham Veterans Hospital, Van Nuys, California.

**Jane Gladhill** is now married to Robert E. Compton and will continue with her work at St. Mary's Hospital, Astoria, Oregon.

**Mrs. Lois E. Gorton** (**née Falkner**) is now living in Missoula, Montana.

**Virginia Gross** formerly on the staff of Protestant Episcopal Hospital, Philadelphia, is now married to Clyde T. Cummins. Her new position is that of teaching dietitian at Connemaugh Valley Memorial Hospital, Johnstown, Pennsylvania.

**Enid E. Heatley,** until recently with the Veterans Administration, resigned her position to be married to Lieutenant Commander Robert G. Lavenson on August 23.

**Helen Hubbell** became Mrs. Philip L. Alger on November 9 and has moved from Connecticut to Schenectady, New York.

**Florence Hytken** (**née Bernstein**) was married recently and is now living in Cleveland, Mississippi.

**Caroline A. Kessler** is the new Mrs. Edward F. Roubal.

**Alta Kibler,** until recently in the Army, is now Mrs. George Lucht.

**Katherine Kratoska's** marriage to J. W. Birsner has been announced. The couple are now living in San Francisco.

**Margaret M. Krauser** (**née Telich**) was recently married and has left her position at Columbia Hospital, Milwaukee, to become assistant director of the Dairy Council of Milwaukee.

**Annette LaBerge** was married to Hugh Mattoon on September 14, and has moved from Minneapolis to Loveland, Colorado.

**Phyllis LaFontaine** (**née Pierce**) will continue to live in Boston following her recent marriage.

**Helen Lambarth** resigned her position as clinic dietitian at Grady Hospital, Atlanta, Georgia, to be married to Dr.

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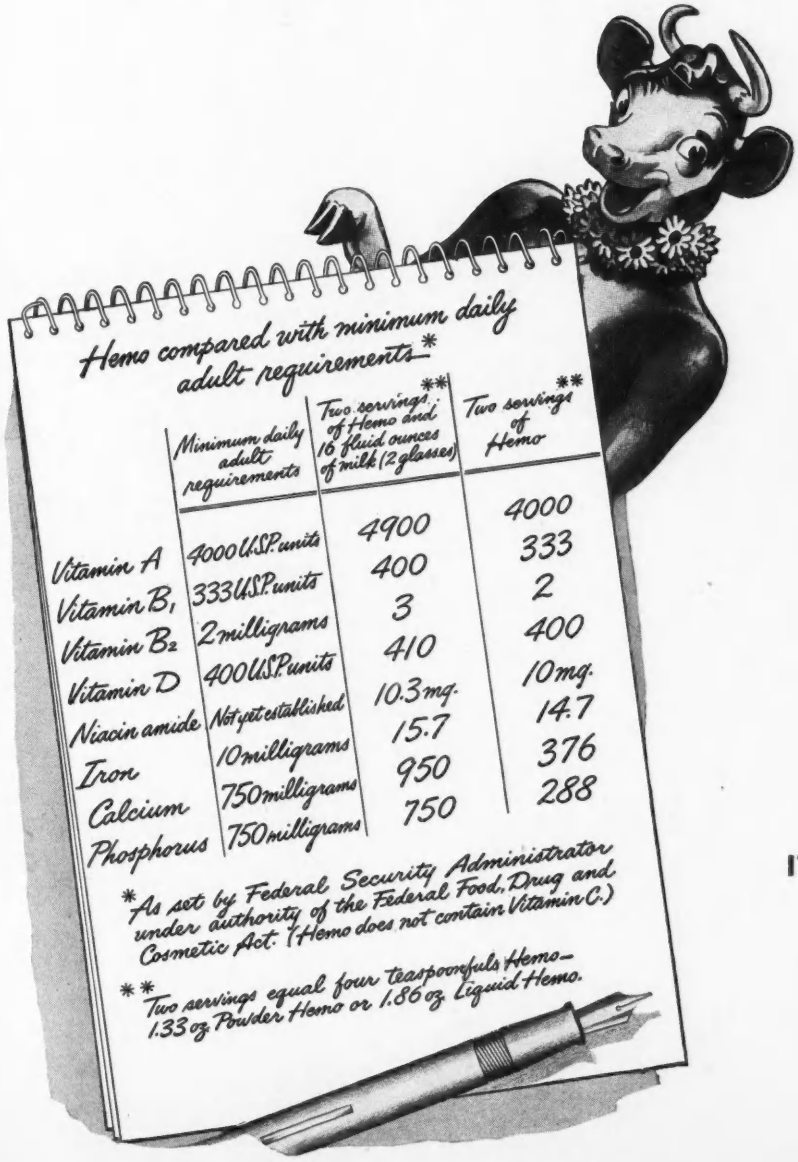
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James H. Moser. The couple are now living in Bloomfield, Indiana, where Dr. Moser is a veterinarian.

**Marcella Lantz** is now Mrs. Raymond Roth and is living in Santa Maria, California.

**Martha Linde,** formerly clinic dietitian at Henry Ford Hospital, Detroit, is now Mrs. Richard Grant Glover and is living in Cliffside Park, New Jersey.

**Nancy McCall** was married on October 22 to Alexander P. Burruss in Norton, Virginia. She has resigned her position at Women's College, University of North Carolina, and is now at home in Beacon, New York.

**Luella Midgley** became Mrs. Frank E. Yakubec, Jr., on September 14. She has resigned her position at Multnomah County Hospital, Portland, Oregon.

**Julia Minsinger** was married to D. E. Hennigh on September 12 and is now living in Corvallis, Oregon.

**Patricia Ellen Mullins** recently became Mrs. C. F. Kukla.

**Jane Neal** has resigned her position at Wilmington General Hospital in Wilmington, Delaware, to be married. She is now Mrs. Frederick L. Halpin and is living in Summit Hill, Pennsylvania.

**Lucille L. Nider** became Mrs. W. C. Friedland, Jr., on August 1.

**Betty M. Odom** has resigned her position at Mercy Hospital, Chicago, and is now Mrs. John W. Whelan of North Hollywood, California.

**Sara Nell Price** and Louis Edward Schumaker were married on December 27, in Portland, Oregon. She has been employed at Madigan General Hospital, Ft. Lewis, Washington.

**Ann Kathryn Sack** is now Mrs. John C. Byers and is living in Veterans Village, Stillwater, Oklahoma. Formerly she was at St. Mary's Hospital, Detroit, Michigan.

**Jean Shelley Smith,** following her release from the Army, was married to Lieutenant William T. Clark. They are making their home in Rome, Georgia.

**Patricia W. Smith** is no longer at Kansas State College. She was recently married to Keith E. Mead and is living in Manhattan, Kansas.

**Margaret K. Sparkman** became Mrs. Martin L. Bland on July 2 and is now living in Dade City, Florida.

**Rosemary Stewart,** a former student of Shadyside Hospital, Pittsburgh, was married to John Kennedy on December 21, and is living in Grove City where her husband is a professor at Grove City College.

**Miriam Stringfield (née Cuming)** is now living in Vallejo, California. Until recently she was on the staff at Arroyo Del Valle Sanatorium, Livermore, California.

**Dorothy Sturdy** was married to H. M. Sheppard on November 27, and is living in Tuscaloosa, Alabama, where she is manager of University Club, Inc.

**Elizabeth Taubert (née Schofield)** was married on October 15 and has moved from Akron, Ohio, to Cleveland Heights.

**Constance Weiss,** former staff member at Shadyside Hospital, Pittsburgh, is now Mrs. Edward Winkleman and is living in California.

**Doris Louise Windsor** became Mrs. James Anthony on October 20. She has resigned her position at Veterans Hospital, Portland, Oregon, and is now living in Lynbrook, New York.

**Gail S. Wood (née Smith)** was recently married and has moved to Washington, D. C., from Ashland, Virginia, to make her home.

## *News of Advertisers and Exhibitors*

*Ralston Purina Company* has recently published a new allergy diet sheet, "Restricted Diet for Determination of Suspected Food Allergy." It is intended for use when the physician is tracking down offending foods . . . . *Armour and Company* has published two more booklets in its series of meat study guides. They are: "Study Guide for Quick-Frozen Table-Dressed Poultry" and "Fresh Pork Study Guide" . . . . *General Mills* announces the promotion of Marjorie C. Husted to the new position of consultant to the officers and executives of General Mills and its agencies in the field of contacts and relations with women. Janette Kelley, formerly assistant director, will succeed Mrs. Husted as director of the Home Service Department . . . . *General Mills* recently placed on the market new size packages of split pea and vegetable noodle soup ingredients. The new packages will yield fifty servings or 2 gal. . . . *American Can Company* celebrated the opening of its enlarged research laboratory at Maywood, Illinois, on November 20 on the fortieth anniversary of the founding of its research division. . . . Vincent N. Antonell has joined *S. Blickman, Inc.*, as kitchen equipment engineer and consultant. . . . *Lederle Laboratories* has announced a new package for Cerevim. The 1½-lb. package has a separate, tight-wrapped printed label completely covering the sealed package. The new bulk carton, in the form of a 25-lb. safety drum is now being offered for institutional use. . . . *Corning Glass Works* has announced that tests of Double-Tough tumblers showed them to be far more durable than standard annealed tumblers. The tests were conducted with 9-oz. high-ball tumblers and 9-oz. water tumblers. The ratios were 3.06 to 1 and 4.3 to 1. . . . *Toastmaster Products Division, McGraw Electric Company* now has available a complete range of sizes of the Toastmaster Roll and Food Warmer. They are available in two, three, and four-drawer models. . . . Official announcement has been made of the change in name from *Edison General Electric Appliance Company, Inc.*, to *Hotpoint, Inc.*, a General Electric affiliate.

## *Leave Pay for Dietitians Who Served with the Army*

The Surgeon General has announced the passage of Public Law 500 (79th Congress), dated 11 July 1946, which authorized the payment for accumulated and accrued annual civilian leave to female dieticians and physical therapists whose civilian appointments were terminated pursuant to section 4 of Public Law 828, dated 22 December 1942.

Unless such payment has already been accomplished, this legislation authorized the payment for such leave for individuals in the following categories who served as civilian dietitians in the Medical Department of the Army prior to 31 March 1943.

(a) Commissioned dietitians who are now in the military service;

(b) Former commissioned dietitians who have been separated from the military service;

(c) Civilian dietitians who were not appointed in the military service.

Information regarding the procedure for applying for such payment is now available.